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VIEWS, NEWS AND INTERVIEWS.

The Lake Street Elevated Railroad, in Chicago, claims to be saving over $10,000 a month in the cost of operation by electric motors as against steam locomotives.

A man riding on the rear platform of a Brooklyn, N. Y., trolley car desired to get off, and as the conductor was up forward collecting fares, the passenger decided to ring the bell himself. Just as he reached for the fare-register strap, the conductor saw him and yelled out, "Don't touch that! Let that alone! Don't touch it!"

The man dropped the register strap, and, after the conductor had pulled the bell strap, got off the car. An old lady sitting near the door tapped the conductor on the arm with her umbrella and asked:

"Why did you tell that man not to touch the strap? Would he have got a shock?"

"Naw," replied the conductor, "but I'd been out five cents," and he said it as if he wished the man had received a shock.

Incandescent lamps can not be stolen from a new lamp socket recently patented. A key locks the globe in the socket.

Washington Hoskins, a colored policeman traveling out of the Twenty-second Street Police Station, in Chicago, is about to launch himself upon the world as an inventor and human benefactor. Electricity is the field of his operations.

"I take two jars," he said to a reporter, "containing the cylinders, connected by wires with a 16-candle-power incandescent burner, and fill the jars with water. Nothing will then take place. But as soon as I drop my chemicals into the water, the light will blaze up as brightly as any you ever saw. Some of the material I use to produce this effect is stuff that you walk over every time you walk over a vacant lot. That is, it is vegetable matter.

"The electricity generated in this way is so abundant that it affords unlimited power as well as illumination. By multiplying the jars, I can generate enough to illuminate this city and to operate every factory and railroad in its limits. I have generated 500 volts with the small machine in my room. As to the cost of doing this, I have concluded that it is not to my interest to speak any further than to say that the cost will not be more than one-half of what it would be by any other method."

A walking telephone caused considerable merriment in the business houses of Oak Park, Ill., recently, says a Chicago paper. J. C. Chester, of Glendive, Mont., was the curiosity, and the speaking tubes and 400 yards of wire that are carried upon his person caused no little excitement among the pedestrians. A sign upon his breast which read, "Yell 'Hello,' and wait for a bell ring," made him conspicuous as he walked about.

Chester is an inventor and is deaf and dumb. He says he is on his way to Washington, D. C., to secure a patent on his contrivance, which assists "deaf persons to hear and dumb persons to talk." He needs money to get there and asks for assistance. He asks by means of a little tin whistle, through which he lisps and breathes at the same time. The sound thus produced is very distinct, but resembles a Punch and Judy dialect. He receives the reply through a miniature telephone transmitter. The telephone is connected with the ear by four feet of insulated wire and receives its current from a dry battery carried in the hip pocket.

Chester says he is a graduate of the Columbus, Ohio, Deaf Mute Asylum, and carries credentials purporting to be signed by Prof. C. M. Fulton, of that institution. His journey thus far from Montana has occupied six weeks, he says, and he expects to make Washington during the coming month.

The Metropolitan Traction Company, of New York city, last week issued the following circular:

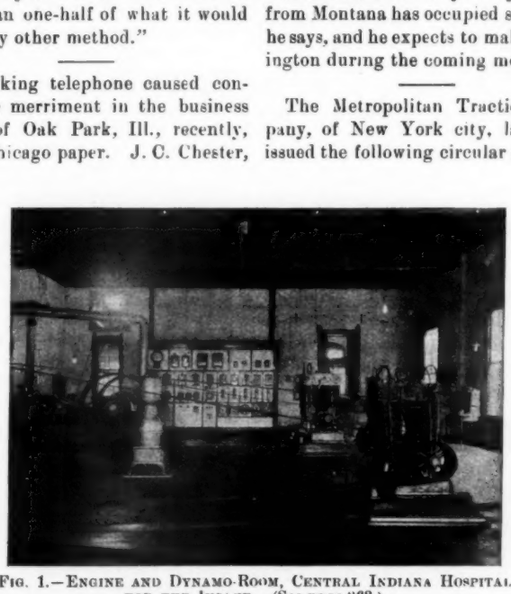

FIG. 1.—ENGINE AND DYNAMO-ROOM, CENTRAL INDIANA HOSPITAL FOR THE INSANE.—(See page 263.)

"The Metropolitan Traction Company is not an operating railroad company. It is a construction and investment company, and holds in its treasury all of the stock of the Metropolitan Street Railway Company, whose system of roads it has built. The directors of the company decided to-day to divide the stocks in the treasury of the Traction company among the stockholders. It will also divide among the stockholders certificates of indebtedness of the street railway company in the form of interest-bearing scrip, redeemable at par within three years. The net result of this decision will be that each stockholder of the Traction company will receive interest-bearing scrip and dividend-paying stock of the Metropolitan Street Railway Company, aggregating 20 per cent more than his present holdings of Traction stock."

THE TRANSMISSION OF NIAGARA POWER TO BUFFALO.

SOME INTERESTING FEATURES CONNECTED WITH THIS IMPORTANT PROJECT.

The successful opening of the electric transmission line between Buffalo and Niagara Falls on November 16, which was fully described in last week's ELECTRICAL REVIEW, passed off unusually smoothly for such a large undertaking. The success of the project, aside from the engineering ability displayed in the construction and operation of the line, is primarily due to Messrs. William B. Rankine, George Urban, Jr., and Charles R. Huntley, all of whom are prominently connected with the Cataract Power and Conduit Company and the Cararact Construction Company. The labors of these gentlemen during the past few months have been almost Herculean. Mr. Rankine has devoted his time principally to the Niagara Falls end of the line, while Messrs. Urban and Huntley have taken care of the Buffalo end.

At the last minute it seemed as if all this labor would go for naught, and the opening of the line would have to be postponed. At 10 o'clock on Saturday morning Mr. Huntley received word that the three transformers, shipped from Lynn, Mass., which were to be installed at the Buffalo end of the line, were sidetracked on a condemned car 11 miles east of Syracuse, and it seemed a physical impossibility to bring them to Buffalo and get them installed in time to open the line on the 15th, as required in the 35-year contract entered into between the Cataract Power and Conduit Company and the Buffalo Railway Company.

When the ELECTRICAL REVIEW representative saw Mr. Huntley shortly after 10 o'clock Saturday morning, he was hard at work on the telephone, endeavoring to get the transformers started on their way to Buffalo. Through the courtesy of the officials of the New York Central & Hudson River Railroad, and after a great deal of hard word and mental agony, the

transformers were finally landed at the Carroll street freight house, Buffalo, at 12.40 A. M, Sunday. Each of the transformers weighed 9,000 pounds. They were loaded on trucks and hauled around to the Niagara street power house of the Buffalo Railway Company. Here they were unloaded, placed on skids and lowered down the hill in the rear of the power house, to the door of the transformer house, where they were to be installed. The first transformer was set in place at seven o'clock A. M., and the others were set up by 10 o'clock. Mr. Huntley had followed the progress of the work until five o'clock, when he returned home for a short rest. After the transformers were up, the connections were made and everything was pronounced in readiness for the current at five o'clock Sunday afternoon. Some of the General Electric Company's men, who were installing the transformers, worked continuously without sleep for 48 hours at a stretch.

Earlier in the week another possible cause of delay presented itself in the way many of the porcelain insulators broke down under the rigid test of 40,000 volts of alternating current. Mr. J. G. White, of the White–Crosby Company, who constructed the line, having a force of some 200 men, saw that there was a chance for delay in this respect, and at once telegraphed to the three concerns who manufactured the insulators to express all that they had on hand to Buffalo at once. When it is borne in mind that these insulators weigh nearly 12 pounds apiece, the size of Mr. White's express bill may be inferred. Suffice it to say that enough insulators were received and passed through the test to equip the line and have it ready for the current on Friday evening, November 13, at five o'clock.

On Sunday afternoon a group of interested men were waiting at the Niagara street power station for the transformer work to be finished. Mr. Huntley asked Mr. White if his part of the work was finished, and Mr. White reported that his line had been ready and waiting for nearly 24 hours, and that it had been inspected and carefully gone over several times. Mr. White at once went to the telephone, called up his branch office in Tonowanda, and asked the foreman in charge of the work if there were any men at work on the line. The reply came back that all the men had reported, and that no one was on the line. In order that no chances might be taken, Mr. White instructed another inspection of the line, and ordered his foreman to make certain that no one should be sent out to work on the line from that time on.

About eight o'clock Sunday evening everything was got in readiness at both ends of the line for a preliminary test. The big 5,000-horse-power Westinghouse generator at the Falls, which had been at rest, was gradually started up. The switches were closed, and, as the machine picked up, current was gradually sent in increasing force over the line. At 8.57 P. M. the first note of the alternating current in the transformer house in Buffalo was heard. At 9.10 P. M. the current was thrown on to No. 1 rotary in the Niagara street power house. To the surprise of every one present, the converter began to revolve in the opposite direction from which it was designed to work. The current was thrown off, connections on the machine were changed, and at 9.41 P. M. current was again turned on and everything worked smoothly. After a few minutes' run the switches were opened and everything was closed down in readiness for the final test at 12.01 A. M., November 16, as already described in the ELECTRICAL REVIEW. Among those who were present at the final opening were Mayor E. B. Jewett, of Buffalo; E. J. Hall, general manager of the American Telephone and Telegraph Company; Henry M. Watson, president of the Buffalo Railway Company; George Urban, Jr., president of the Cataract Power and Conduit Company; Charles R. Huntley, vice-president and general manager of the Cataract Power and Conduit Company; H. H. Littell, general manager of the Buffalo Railway Company; W. L. R. Emmett, chief engineer of the General Electric Company's lighting department; J. G. White, of the White–Crosby Company, builders of the line; Horatio A. Foster, Frank S. McGraw, and the ELECTRICAL REVIEW representative.

In the building of the line the heavy overhead conductors were stretched upon the cross-arms by means of a horse hauling on the end of a wire. A thrilling incident took place toward the close of this work. Mr. Wilson, foreman in charge of the work for the White–Crosby Company, was leading the horse hauling the conductors in place. A small boy was playing in the vicinity, and as the shining copper cable dragged over the ground he took hold of it with both hands. Just at that minute all the slack in the line was taken up and the boy went up in the air with the wire. He let the wire slip through his hands, slightly lacerating them, but finally decided to hold fast. As the wire stretched he was carried toward the cross-arm on one of the poles and finally let go of the wire and took hold of the cross-arm with both hands, hanging in that manner about 40 feet from the ground. As soon as the workmen saw what had occurred, they yelled to Mr. Wilson, who at once stopped the horse and ran back to the boy, telling him to hold on as long as he could. Mr. Wilson shinned up the pole, got the boy just in time, and placing him on his back, carried him safely to the ground. What might have been a fatal accident was averted by the prompt action of Mr. Wilson.

The following table of dates will be of interest as giving in brief form a history of the work done in harnessing Niagara Falls for electric power:

Niagara Falls Power Company, incorporated	March 31, 1886
Cataract Construction Company, incorporated	Feb. 10, 1889
Work begun on tunnel	Oct. 5, 1890
Competitive plans invited for development of power and its transmission to Buffalo	Dec., 1891
Canal completed	Oct., 1895
Tunnel completed	Jan., 1893
Application to City of Buffalo for franchise	Jan. 10, 1895
First dynamo started	April 5, 1895
Pittsburgh Reduction Company (first application of power) began operations	Aug. 26, 1895
Franchise granted by City of Buffalo	Dec. 16, 1895
Franchise accepted by Power company	Jan. 14, 1896
Cataract Power & Conduit Company, incorporated	July 17, 1896
Work on transmission line begun	Aug. 14, 1896
Transmission line completed	Nov. 15, 1896
The first current sent over the transmission line, 8.57 P. M.,	Nov. 15, 1896
Final test of line, 12.01 A. M.,	Nov. 16, 1896
First street car operated in Buffalo by Niagara Falls current, 10.05 A. M.,	Nov. 19, 1896

One of the best stories describing the transmission of current over the line was that printed in the Buffalo *Express* on Sunday, November 16. The first two paragraphs of this article will show the character of the story, and are printed below:

Out of the mystical world of mightiness, gliding through the darkness silent as the sun, there came to Buffalo at midnight the most potant factor in civilization—energy. What is a throne without the power behind it, or the sword without the strength to wield it, or the pen with a nerveless hand to touch it? The citadels of civilization, massive monuments uplifted by mal, quake and crumble above the heaving of the earth. The bursting breast of Nature razes what is raised by her children. The wild rush of waters hitherto has swept onward unrestrained. Strongest of all the streams below the stature of the sea is Niagara. Through countless centuries, when all else put on the yoke of bondage, she poured in power supreme. The ocean bowed her head while the creation of commerce ploughed deep furrows across her face. The mountains, punctured by the paths of progress, yielded up their treasure. The skies gave forth their rain in response to the explosive clamor of mankind. Yet Niagara rolled on, free and unrestrained. The labors of modern genius, backed by the efforts of bygone brains, have been directed to breaking her to harness made by man. The dream of capital has been of the goal sought by genius. That dream has come true. The goal has been reached. The power of Niagara not only has been harnessed, but can be driven wheresoever the wheels can turn or the lines can guide.

Like a wild, new-broken colt is this power. The reins that hold her head are the long wires stretching from the power house at Niagara Falls to the power house of the Buffalo Railway Company on Niagara street, at the end of Prospect avenue. The wheels of her vehicle are the ponderous circles that mark the whirl of the business world. Her heart is the throbbing dynamos, out of which comes the current of commercial life. Safe in her stable, she has learned to labor. This morning she made her first miles outside. Swiftly she sped. The boon that she brings bodes millions to men. Her power is practically unlimited. Her resources measure the means of mankind, and still are unfathomed.

When the first 1,000 horse-power of current is put to actual use in Buffalo, it is expected that the drop in the line 26 miles long, between Niagara Falls and Buffalo, will be 11.4 per cent. The contract calls for the delivery of 10,000 horse-power by January 1, 1897. When this amount is supplied, it is expected that the drop in the line will be materially reduced.

Mr. C. E. Newton, of the Jewell Belting Company, Hartford, Ct., was a visitor to New York city last week.

ROENTGEN RAYS ACT STRONGLY ON THE TISSUES.

BY ELIHU THOMSON.

In some notes on Roentgen rays I have referred to an experiment made to determine the truth in regard to the effect which it had been claimed was produced locally upon the skin and tissues of those subjected for a prolonged period to the radiation from a Crookes tube. I noted the fact that after exposing the little finger of my left hand for half an hour close to the bulb, and about one and a quarter inch from the bombarded platinum, no decided effect followed until over a week; that the finger then reddened, became extremely sensitive, swollen, stiff, and to a certain extent painful. A slight blow or pressure would produce sharp burning pains. I wish to add that at present about 17 days have elapsed since the exposure, and the finger is still quite sore, but showing signs of improvement. Two-thirds of the exposed portion is covered by a large blister, which becomes larger each day. The pain and sensitiveness are less after the blistering takes place. The effect has not extended through the finger, but is confined to the back and sides, and is strictly limited to the exposed portion. Curiously, the skin over one of the joints of the adjoining finger, less exposed to the rays, became red and sore, but has become nearly normal without blistering, while a portion of the second finger, on the side towards the source of radiation, was reddened, but made only slightly sore and for but a short time only. There is evidently a point beyond which exposure can not go without causing serious trouble. It may also be that several shorter exposures would have an equal effect if made within a few days. The effect on my finger was made in a single exposure of half an hour at short distance, and by the law of inverse squares would be the same as from 10 to 12 hours at six inches distance. I do not think that the effect is electro-static at all, as has been suggested, a view which I was at first inclined to favor, but the effect produced on the adjoining fingers, which were farther from the tube than the small finger, and were electro-statically shielded by it, negatives the electro-static theory. The evidence, so far as it goes, leads me to think that the effect is another indication of the chemical activity of Roentgen rays, of like character to the effect of the high-pitch waves of light in causing sunburn, but penetrating more deeply into the tissues. It remains to explain the long "period of incubation," which is peculiar, and is akin in effect to the well known period of incubation in various affections due to disease germs. Here might be the place to issue a caution to experimenters; it is, do not expose more than a finger. Be satisfied with the effect of, say, five hours' exposure at six inches distance, and do not prolong it to equal a longer time, or there may be cause for regret when too late. Personally, I have been quite more than satisfied with the results of my inquiry into the action of the rays on my own tissues.

Knott X-Ray Apparatus.

The accepted theory as to the requirements of the best X-ray machinery are high voltage, low amperage, the highest attainable frequency and regulation of discharge. These results have been excellently accomplished with the high-frequency coils now being made by the L. E. Knott Apparatus Company, 14 Ashburton place, Boston, and illustrated herewith.

As shown in the engraving, Fig. 1, a unique arrangement for transforming the direct to the alternating, as must be done for the best effects, is involved in the machine. The transformer takes a current of 52 volts and delivers at 35,000 volts. This induced current is to charge a condenser, and the condenser discharges through the primary, which is a modified form of the Tesla method construction, so as to permit the greatest number of oscillations of the condenser. The condenser is made in a permanent form and can not break down. The consumption of current in the coil is about one and one-half amperes with 104 volts. The general form of the instrument is made for both alternating and direct current.

The mechanical spark gap is used in this machine, and the patent method of controlling the discharge of the condenser, so as to avoid the flashing effect on the fluoroscope, is an important feature.

The illustration, Fig. 3, shows the new adjustable vacuum tube, which can be adapted to high or low-voltage currents. The lack of definition sometimes complained of in the alternating current has been entirely obviated in this form of tube. Poor definition is due to X rays being given off from two points instead of one. With this form the source is reduced to one point.

If desired, the direct current can be used with the apparatus. The definition, character of discharge and general Tesla effects are found to be the same as when the alternating current is used, the same form of tube being used on the machine.

With the view of facilitating medical diagnosis, a fluoroscope, with an instantaneous cut-off, illustration Fig. 4, has been perfected by the Knott Apparatus Company, so adjusted that the operator can control the current by pressing the button on the handle of the fluoroscope. This also is made to hold a photographic film.

The diagnosis is obtained by allowing the screen to be brought to such a point in the fluorescence that slight indications of the result looked for are noticed. At this point the current is cut off, then the current is again turned on, and the fluorescence brought to the same point.

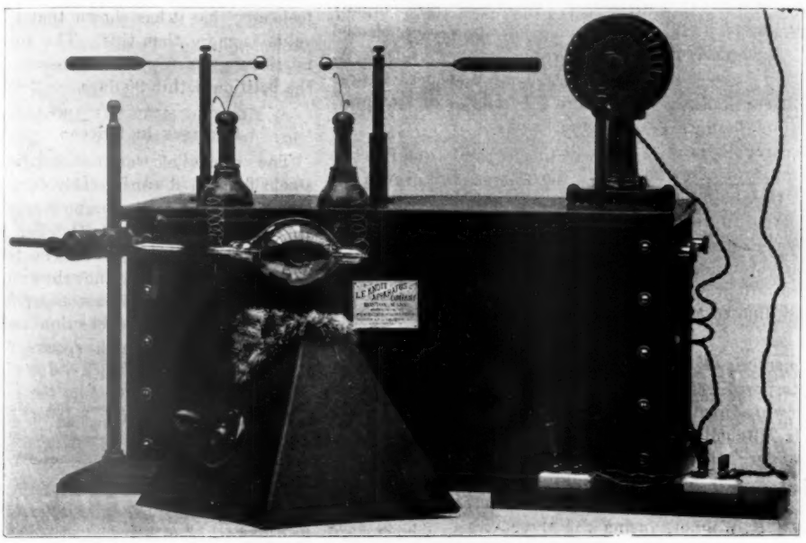

FIG. 1.—THE KNOTT ALTERNATING-CURRENT HIGH-FREQUENCY X-RAY COIL.

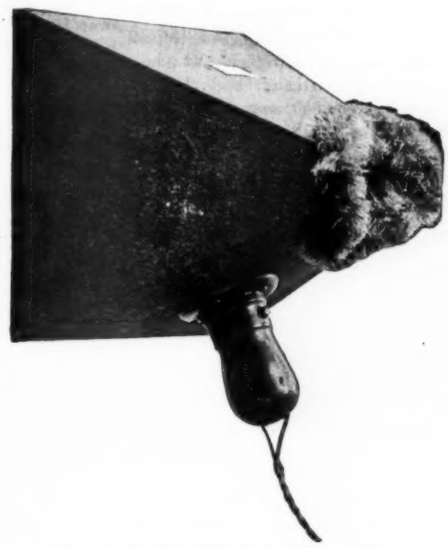

FIG. 4.—KNOTT FLUOROSCOPE WITH ROBART'S SWITCH.

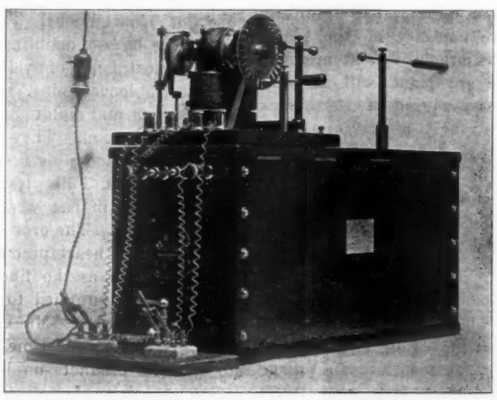

FIG. 2.—THE KNOTT DIRECT-CURRENT HIGH-FREQUENCY X-RAY COIL.

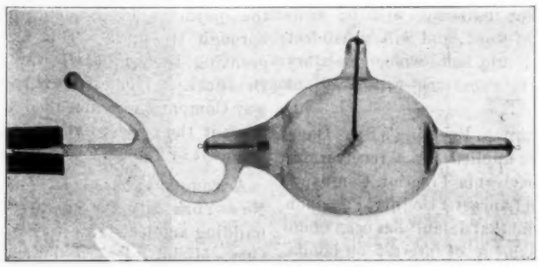

FIG. 3.—KNOTT ADJUSTABLE VACUUM TUBE.

OUR CANADIAN LETTER.

HULL, QUE.—The Hull Electric Company are putting in the wires through Hull city for house-lighting purposes.

BRANTFORD, ONT.—A company of local capitalists are promoting a scheme for an electric railway from Brantford to Ayr.

KOOTENAY, B. C.—Notice is given by Messrs. Bodwell & Irving, of Victoria, that an extension of time for the commencement of operations under the Kootenay Power Company's construction act will be asked for.

OTTAWA, ONT.—The Ottawa Electric Railway Company commenced work on the proposed extension of their tracks from Chaudiere to the E. B. Eddy company's yards, for the purpose of handling the freight of this company.

MONTREAL, QUE.—The Montreal Street Railway Company has extended its tracks from the Grand Trunk Railway crossing at St. Henri, on Notre Dame street, to Cote St. Paul locks. The new line is a mile in length and was inaugurated yesterday morning.

CORNWALL, ONT.—The electric street railway has commenced the construction of the last branch of its road. This is the division which runs to the Toronto Paper Company's mill, three-quarters of a mile above the town. The railway is being built on the main road instead of on the canal bank, as at first intended. The work is to be rushed, so as to put it in running order before Winter. The street railway will likely secure the freight traffic to the mills and be able to make a considerable reduction in freight rates.

MONTREAL, QUE.—Two contracts were awarded on Saturday, by tender, by the Lachine Rapids Hydraulic and Power Company. One was for all the electric cables required for the ducts at present being laid throughout the city. The National Underground Cable Company, of New York, was the successful concern, their contract being worth $50,000. The Wagner company, of St. Louis, Mo., got the contract for the transformer required for reducing the current from 5,000 to 220 volts. They will cost between $8,000 and $10,000. In both cases the goods are to be delivered by Christmas. J. A. C.

Montreal, November 20.

A most unusual case of fatal electric shock is reported in press dispatches from Los Angeles, Cal. It is stated that C. C. Odell, conductor on an electric street car, was killed by an electric shock, received while using a telephone on November 19. He had just taken down the transmitter when he uttered a shriek and fell to the ground. When the bystanders reached him he was unconscious, and he died in a few minutes. The trolley wire, it is said, had broken and crossed the wire of the telephone used by the street-car company.

Electric Railways.

The Consolidated Traction Company, of Newark and Passaic, N. J., and the Newark Traction Company have been consolidated.

By December 1 it will be possible to go continuously on the trolley from Market street, Paterson, N. J., to the Pennsylvania ferry at Jersey City.

The town of Springfield, Vt., has issued four per cent bonds to the amount of $30,000, as a subscription for stock of the Springfield Electric Railway Company.

Attorney S. M. Coon, representing Receiver Tiddman of the Street Railway Company, of Oswego, N. Y., has decided to postpone for two weeks his motion to issue receivers' certificates to the amount of $12,000.

The Capital City Electric Street Railway, of Frankfort, Ky., has suspended operation on account of poor patronage and inability to pay its running expenses. It is probable the United States court will order sale of the road January 1.

By the opening of the new year the Sunset Telephone Company will have a wire connecting San Diego with San Francisco. The line now extends to Santa Ana, in Orange County, but the gap to be bridged is over very rough country.

One of the new improvements that will follow McKinley's election is the electric railroad from Sacramento to Orangeville, Cal., the center of a rich fruit district, 22 miles from the capital city. The road is to cost $400,000, and it is backed by Minnesota and Iowa capitalists.

It is reported that one gigantic traction company is to be formed of all the street railway lines in Pittsburgh, Pa. Its capital is to be $50,000,000, and it will be controlled by the Widener–Elkins–Magee traction syndicate, under the title of the United Traction Company.

Plans have been filed by the West End Street Railway for a car house to be erected in Neponset avenue, near Neponset Bridge, Dorchester, Mass. The building will be constructed of wood, and will be 540 feet long and 91 feet wide, one-story high. Its cost is estimated at $50,000.

The John A. Roebling's Sons Company have applied for a receiver for the Pennsylvania Traction Company, located in Lancaster County, Pa., upon the ground that default has been made in the payment of interest on bonds. The plaintiff, it is stated, holds $62,600 of bonds of the defendant company.

At the annual meeting of the Amherst, Mass., & Sunderland Electric Railway Company the following directors were chosen: T. L. Page, M. A. Dickinson, Walter D. Cowles, Rev. George E. Fisher and H. B. Edwards, of Amherst, and George L. Cooley and F. L. Whitmore, of Sunderland; clerk, C. F. Deuel.

A company has been formed to give the city of Charleston, S. C., an electric street railway service. It has a capital of $200,000, and has secured a franchise from the Charleston City Council to use the principal streets. The system will comprise over 10 miles of track. Among the principal promoters are Messrs. J. B. Chastain and J. L. Lawrence, of Baltimore.

The Hartford, Ct., Street Railway Company, the Newington Tramway Company and the Central Railway and Electric Company, of New Britain, have filed in the Superior Court their appeal to the Supreme Court from Judge Wheeler's decision against them in the suit brought by the New England Railroad to prevent them building a trolley line to New Britain.

At a stockholders' meeting of the Hampden, Me., & Winterport Electric Street Railway the following directors were chosen: Henry L. Mitchell and E. C. Nichols, of Bangor; H. W. Mayo, of Hampden; A. Kelsey and Tracy Walker, of New Haven; Thomas M. Waller and S. H. Wagner, of New York. At a directors' meeting these officers were elected: H. L. Mitchell, president; Israel A. Kelsey, treasurer; H. W. Mayo, secretary.

The propulsion of street cars by compressed air is in successful operation in Paris, Berlin, Dresden and other European cities, and it is probable that this same power will soon be introduced into San Francisco, Cal., for the movement of street cars. It is understood that the Market Street Railway Company will await investigations now being made before changing the cable system of the Howard street, the Post street and the Montgomery street lines.

Braddock, Pa., council has declared the right of way granted to the Braddock Electric Railway Company forfeited. This company has lines along Talbot avenue, but has not operated them for 16 months. The company can recover its privilege by the payment of $5,000 into the borough treasury. The ordinance granting the right of way to the Braddock & Homestead Street Railway Company was amended so as to allow it the same privilege upon the payment of $5,000.

A company has been formed in New York city for the purpose of building an electric railway from Bay City, Mich., east to Fairgrove, in Tuscola County, with diverging branches from that place, one going north to Sebewaing and Unionville, and the other southeast to Caro. The system will use three rails, the current being supplied by the one in the middle. A road of this kind is in operation in the northwest, and cars on it have attained a velocity of 80 miles an hour. In addition to this road, there is likely to be another built on the west side of the river.

ELECTRIC LIGHT FLASHES.

The bond issue recently authorized for extending the Falls City, Neb., electric light plant has been declared invalid by the State Auditor.

Electric light trustees at Bellefontaine, Ohio, have appealed to council for more aid, stating that they must have at least $3,000 immediately, or shut down the works.

At the annual meeting of the Meredith, N. H., Electric Light Company the following officers were re-elected for the ensuing year: President, A. W. Ives; general manager, George F. Sanborn; secretary and treasurer, E. C. Mansfield.

The earnings of the Edison Electric Illuminating Company of New York for October, including the high-tension systems, were as follows:

	1896.	1895.	Increase.
Gross.....	$193,826.10	$160,479.47	$33,346.63
Net.....	89,432.54	64,039.19	25,393.35
Gross, 10 mos..	1,775,632.65	1,594,700.51	180,932.14
Net, 10 mos...	837,209.21	731,404.51	105,803.70

The Edison company of New York city and the Edison Light Company of Grand Rapids and Lowell have begun suit in the United States Circuit Court against the Lowell Water and Light Company and the Peninsular Light, Power and Heating Company to prevent the defendants from using the three-wire system of electric light current distribution, on which the plaintiffs claim to own patents.

It is understood that after the sale of the Des Moines, Iowa, Water Power and Electric Company's plant to the General Electric Company is effected, and the consolidation of the plants is consummated, James A. Colby, present resident manager of the Edison plants, will have the management of all the plants in Des Moines. The sale will take place November 24, and it is expected the consolidation will be effected immediately after that date.

The improvements which will be begun at the electric light plant at Parkersburg, W. Va., will result in making the capacity of the plant just twice as large as it is at present. The entire arc plant will be duplicated. An engine of 150 horsepower, Westinghouse pattern, will be put in in the place of the 75-horsepower engine now used. The latter will be made to do incandescent work. The total cost of these extensive improvements will be about $10,000.

A plan for using electricity to light the streets of Bay Shore, L. I., is just now being agitated by a number of the leading members of the Village Improvement Society. The streets are now lighted by a conspicuously small number of gas lamps, many of the side streets being almost completely unlighted. There is an electric light plant in operation here now, with lines in every street, so the matter could be settled with very little difficulty or disturbance. If the plan should be carried out, the lamps will be placed 300 feet apart on both main and side streets.

The electric light company has had its last meeting before the Gas and Electric Light Commission in Boston on the securing of its $200,000 bonds for use in establishing its Indian Orchard, Mass., plant. The commission has required that the company show that its present plant, exclusive of good will, is worth the $500,000 capital stock and $200,000 in bonds. This it has taken some time to do, as experts have had to be called in to make estimates, but the company feels now that it has shown that the value is more than this. The commissioners must give an answer to the petition within 30 days.

Changes in Prices.

The prices of various electrical stocks fluctuated considerably during October, and made returns on November 1, as compared with October 1, that were quite irregular. The full force of the election is not shown on November 1 last, as it was compiled for a date before the election took place. The table, which speaks for itself, follows:

	Oct. 1.		Nov. 1.	
TELEPHONE:	Bid.	Asked.	Bid.	Asked.
American Bell.....	207	207½	203	204
Bell Telep., of Mo.....	185	205	185	205
Chesa. & Potomac.....	56	63	*53¾	57
Erie Teleg. & Telep....	57	....	61¼	....
Hudson River Telep...	45	58	48	53
Mexican Telep.....	65c.	....	65c.	75c.
New England Telep....	90	93	93	....
N. Y. & N. Jersey Telep.	121	123½	119	122
N. Y. & Penna. " ..	78	83	78	83
Providence " ..	*79½	81	81	85
Troy Teleg. & Telep...	90	100	90	100
TELEGRAPH:				
American Dist.....	22	27	25	....
Am. Teleg. & Cable....	89	92	....	91½
Cent. & S. Amer. Cable.	113	117	115	117
Commercial Cable.....	140	....	140	....
Gold & Stock.....	100	105	102	107
Mexican Teleg.	185	195	....	....
Pacific Teleg. & Telep.	70	....	75	85
Postal Teleg. & Cable.	72	81	79½	81½
Western Union.....	80⅝	83¾	84⅜	85⅞
ELECTRIC:				
Boston Elec. Light...	100	101	100	101
Detroit Elec. Works...	....	.05	....	.05
Edison Ill., Boston... .	....	137	135	140
" " Brooklyn..	94	96	93¾	95
" " New York..	92	95	94	95
" " St. Louis...	10	17½	10	17
" Light & Power Co., San Francisco.	113¾	118½	118	118½
General Electric.....	28⅝	28⅞	28¼	29¼
" " Pfd...	65	70	64	66
Penn. Ht., Lt. & Pwr....	....	13¾	13⅝	....
" " " Pfd. ($20 paid in.	....	20½	21¼	....
Southern Elec. Lt. & Pow.	9	13	....	10½
Westinghouse Com....	22	....	24	26
" Pfd	49½	....	49	50

Central Manufacturing Company.

The Central Manufacturing Company, of Chattanooga, Tenn., are one of the largest manufacturers in the electrical field of yellow pine cross-arms, locust pins, oak pins, oak brackets and moldings for electrical construction. They supplied the cross-arms and pins used on the Buffalo–Niagara Falls transmission line, described in last week's ELECTRICAL REVIEW. The cross-arms are of hard yellow heart pine and have been spoken of as the finest lot of cross-arms ever supplied to any pole line. The Central Manufacturing Company has at all times a large stock of its products on hand, and makes a specialty of quoting delivered prices, F. O. B. cars, in any city in the United States and in any quantity. They are one of the oldest concerns in their line in the electrical field, and have established a well deserved reputation.

Erie Telegraph and Telephone Company made a net gain of 269 subscribers in October; 2,397 for the 10 months of this year. Total number connected November 1, 20,988.

Electric Sad Irons in a Hospital for the Insane.

Every day new applications of electricity develop and bring us nearer to the time when the most unpleasant and arduous occupations will become a pleasure to conduct. No new plan of electrical development is doing more to assist in bringing about this condition than that of electric heating. The electrical equipment of the Central Indiana Hospital for the Insane at Indianapolis, Ind., shows a striking example of one application where great economy of labor has been achieved and the conditions surrounding the operator vastly improved. The equipment of the laundry with electrically heated sad irons has reduced the number of employés at the ironing tables nearly one-half. The reasons why such results are possible are that the electric irons are constantly supplied with a uniform amount of heat, nearly all of which is absorbed by the work, and, by reason of the constant supply, every rub is equally efficient. There being no appreciable heat radiated from the iron, it is apparent that in a room where the temperature can be regulated, and there is no vitiation of the atmosphere due to combustion, much more work can be accomplished.

The complete electrical plant has been in full operation for about a year. It gives evidence of being planned and built with a view embodying all features which would contribute to and produce an up-to-date and, consequently, most efficient combination.

The equipment consists of three boilers, with a total capacity of 450 horse-power; two 125 horse-power center crank, high-speed engines, each engine belted to two 45-kilowatt Edison type, bi-polar compound, 110-volt generators; one 65-horse power engine, belted to one 25-kilowatt generator of the same type, and one 20-arc-light Edison generator. The illustration, Fig. 1, page 259, shows a view of the engine-room. The three-wire system is used for all incandescent and power distribution, and all mains distributing to the different buildings, for both arc and incandescent work, are under ground.

In addition to the usual switchboard equipment, all mains have separate amperemeters and voltmeter connections. The buildings are wired for 3,020 16-candle-power incandescent lamps for lighting. The 20 arc lights are used to light the campus, groves and drives, the grounds being very extensive, comprising several hundred acres. One three-horse-power motor is belted to an exhaust fan in the generator-room. One 25-horse-power motor, belted to a counter shaft, drives the line shaft, running 12 steam washing machines, two sterilizing machines, four centrifugal extractors, two starching machines and one tumbling machine. This motor also drives one large mangle, skirt ironers, and one or two smaller machines.

In the laundry there is placed a handsome switchboard, which is shown in Fig. 3, equipped with knife switches for controlling the supply of current to 32 laundry irons; also the automatic motor starter and the motor and main line switches. The equipment for electric sad irons is unique. In the illustration is shown one of the tables arranged for 12 operators. All tables are of the same dimensions.

Fig. 2.—Ironing Table Equipped with Electric Sad Irons, Central Indiana Hospital for the Insane.

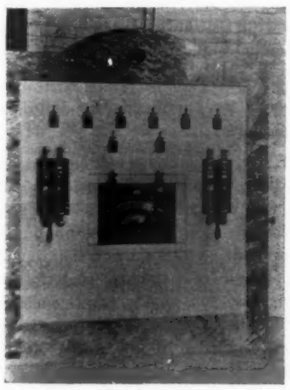

Fig. 3.—Switchboard, Central Indiana Hospital for the Insane.

The detailed description is of interest, bringing out as it does an arrangement (possible only with electric irons) which provides ample room for each operator, and yet permits the grouping of a large number in a comparatively small space. Each table is constructed of hard wood, the central portion being 10 feet in diameter and three feet high. From the periphery of the central section, and two inches below its level, branch out 12 ironing boards or tables, each four feet six inches long by 18 inches wide. Around the edge of the central section are placed 12 cast-iron pedestals, about two and one-half feet in height, from the top of which extends a section of three-quarter-inch iron pipe bent over in the form as shown in the illustration. The wires are brought to the tables through conduits under the concrete floor, and distributed beneath the tables to each upright, through which they pass to porcelain sockets at the ends of the bent pipes. In each socket is inserted a fusible plug attached to a flexible cord leading to the iron, depending in such position that it is always at the right and back of the operator. Small knife switches are conveniently placed near the base of the pedestal for the use of each operator. The clothing to be ironed is deposited on the center table, which is in easy reach of all. The laundry is pleasantly situated in a special building, built for this purpose, and is bright, clean and comfortable, the temperature at the ironing table being never more than 74 or 75 degrees Fahrenheit, except when the outside atmosphere has a higher temperature. The operators are neat and fresh looking, as would be expected from their surroundings.

Fig. 4.—Laundry Machines, Central Indiana Hospital for the Insane.

Only one-half of the number of employés are now used that were required in the old laundry using irons heated with natural gas. This electric ironing installation was made by the American Electric Heating Corporation, of Boston, through their Chicago representative, Mr. F. P. Luther. It is only necessary to realize that one of these tables can easily be placed in a room 20 feet square, and provide accommodations for each operator in every way far superior as to light, temperature, cleanliness and freedom of movement than would be possible by any other means. The saving in cost of labor alone, natural gas being used for fuel in generating electricity, is more than sufficient to cover the total cost of the new method.

Dr. Geo. F. Edenharter, superintendent of the institution, is a progressive, nineteenth century physician, whose success in administering its affairs has been conspicuous, and the Board of Control of the institution, consisting of J. S. Carson, president; John Ostaman, treasurer, and B. H. Davis, secretary, have always been ready to second his efforts. Much credit is due to E. E. Frost, chief engineer, for the well arranged and well ordered machinery plant; and for the electrical work, including the design of the table, the arrangement of the stands and many unique features, Joseph H. Stewart, the electrician, is responsible. He is enthusiastic and untiring in his efforts to extend the usefulness of the department which he controls, and he is much appreciated by the officers of the institution.

Imperial Porcelain Works.

The Imperial Porcelain Works, of Trenton, N. J., of which Mr. Frederic A. Duggan is the proprietor, have recently made extensive additions to their already large plant, and are prepared to make any special type or design of porcelain insulators and porcelain fittings for electrical devices on order. This concern supplied the best lot of insulators used on the Buffalo-Niagara Falls transmission line, as described in last week's Electrical Review. All of the clay used in their product is imported, and the care devoted to the making of their goods is such as to insure the best results. Mr. Duggan has in hand a number of unusually large contracts, and with the increased capacity of his plant, is prepared to handle as many more.

Timely Pointers from Warren, Ohio.

The Warren Electric and Specialty Company, of Warren, Ohio, have issued a blotter with illustrations of their miniature and decorative lamps, and the following timely pointers:

If some men would lose their reputation they would be lucky.

This is also true of some makes of incandescent lamps. Ours do not belong to this class.

No gentleman will swear before a lady. Let her swear first.

There will be no occasion for swearing at all if you use our lamps.

Married men do not live longer than single ones—it only seems longer.

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Electric elevators are just now enjoying a boom. Their safety, flexibility and economy merit it.

The affairs of the Harrison Telephone Company (capital at one time $80,000,000) are again being aired in court. The inventor of the "system," one E. M. Harrison, charges a number of the officers of the company with wrecking it. The Harrison telephone inventions were never of much value, and we presume the eminent men who, for some unaccountable reason, allowed their names to become identified with them soon learned this fact to their sorrow.

THE JACQUES CARBON GENERATOR.

In the ELECTRICAL REVIEW for October 14, 1896, we reprinted a long article from our London namesake, which we then characterized as a rather caustic attack on Dr. Jacques, of Boston, inasmuch as it stated absolutely, as the result of experiments made by Mr. C. J. Reed, that his current was thermo-electric and that there was no such thing as the combustion of the carbon. We further said: "We think Dr. Jacques should, in justice to himself, reply to these criticisms with the results reached at the present time."

It is easy to see now that, at the time we wrote as above, the article in the December *Harper's Magazine* by Dr. Jacques, in which very full particulars are given, must already have been in the hands of the printer. It is in no sense an answer to the London *Electrical Review* or to Mr. Reed, whose cause our London friends so warmly espoused, but it contains statements which are likely to prove startling to both, especially to our London contemporary, whose certainty was so absolute. To their attention we commend the following extract:

"That the electric current was due to the chemical combination of the oxygen of the air with the coke (carbon) there could be no doubt. Quantitative tests showed that oxygen was taken from the air; that the carbon was consumed; that carbonic acid was formed. Moreover, the electro-motive force obtained agreed almost exactly with that which is theoretically obtainable from the combination of oxygen with carbon to form carbonic acid (1.04 volts). That the phenomenon was not due to thermo-electric action was proved by the fact that when the whole apparatus was so inclosed that all parts were kept of uniform temperature, the maximum electro-motive force and current were obtained. Again, later experiments with far larger apparatus have not only confirmed these results, but have shown that under proper conditions the electrical energy obtainable from one of these generators is substantially equal to the potential energy of the weight of carbon consumed within the pot."

As to the results for which we asked, they are given in the table included in the following extract:

"It would be premature to attempt to give any final data as to the efficiency of the new process. Improvements are constantly being made. As compared with modern steam engines, only relatively small carbon electric generators have as yet been built, and it should be remembered that with this generator, as with the steam engine, increased size means increased efficiency per pound of coal, particularly in the coal consumed on the grate. Following, however, are some results of a test (made by experts not connected with the development of the invention) upon a small and comparatively crude horse-power carbon electric generator that has been in occasional use for some six months:

Average electrical horse-power developed	2.16	horse-power.
Average electrical horse-power used by air-pump	0.11	"
Average net electrical horse-power developed	2 05	"
Carbon consumed in pots per electrical horse-power hour	0.223	pound.
Coal consumed on grates per electrical horse-power hour	0.336	"
Total fuel consumed per electrical horse-power hour	0.559	"

Electricity obtained from one pound of coal (of which 0.4 pound was consumed in the pots and 0.6 pound was burned on the grate), 1,329 watt hours, or 32 per cent of that *theoretically* obtainable.

"Thus the efficiency of this particular generator was 12 times greater than that of the average electric light and power plant in use in this country, and 40 times greater than plants of corresponding size."

Mr. Reed, it appears, based his conclusions on three experiments with what he calls "an extemporized Jacques cell," which were fully described in the article we published on October 14. In the light of the description given by Dr. Jacques in *Harper's Magazine*, the fact seems to be that Mr. Reed, instead of criticising the Jacques invention, has been attacking a creation of his own. He should read the patent.

A decided feeling of relief is indicated by all elements in the electrical industry. The manufacturers, the supply dealers and the constructors have certainly reached a point where some relaxation from the intensity of the past two years can be seen. Unless unforeseen conditions arise, which interfere with the return to a normal business basis, the electrical field will materially broaden and the industry strengthen rapidly during the next few months, for the country is bare of all kinds of manufactured products. In New England, Pennsylvania, Ohio, the vicinity of Chicago and the manufacturing centers of the West electrical factories are being reopened, and in many instances the force of workmen and equipment are being increased, due, not to the hope of improved conditions, but to specific and tangible orders.

The interest in the Roentgen ray continues unabated. The army of experimenters is daily increasing and the efforts toward refinement of apparatus are progressive. There are now a considerable number of firms prepared to furnish commercial outfits for X-ray work.

It is evident that the long-distance transmission of electric power from Niagara Falls is a success.

THE FINANCIAL SIDE.

A good deal of the froth and foam has disappeared from the business situation since the election, so that a very accurate view may now be taken. There are some 385 industrial plants that have resumed operations, and nearly 300 more that have enlarged their forces since November 3. Everybody feels hopeful, because there is good ground for encouragement, and it is yet too soon to express disappointment over the failure to materialize of expected changes for the better. That there will be considerable disappointment in some quarters sooner or later there is no doubt. Just now Wall street is in the sulks, because the stock market will neither go up or down. It has been waterlogged for a week, and there is little promise of any change before Congress convenes. This leads to the assumption that the industrial improvement thus far recorded has been discounted by values, and that the outlook is not sufficiently bright, in view of foreign relations and the complexion of the "hold over" Congress, to warrant any further advance. There is no doubt that eventually stocks will go higher, but it will be on buying by the general public, which is just now attending strictly to business in other lines. It is history that the boom of 1879 did not occur until six months after currency legislation had been enacted, while in the case of 1895 it was two months after the bond syndicate loan had been financiered that the market reached its height. Space does not permit of a discussion of the various factors now at work that warrant the belief of good times this year. However, an enumeration of a few is possible. There is a shortage of food supplies throughout the world, guaranteeing a market for the large American surplus. Our trade balance shows an enormous credit in our favor. The industrial revival and high grain prices are certain to make good railroad earnings. This country is in a thoroughly solvent condition. In fact, it was never nearer bed rock, for the reason that its credits have been restricted and stocks of supplies reduced to the minimum. In fact, every condition is ripe to help along a revival in confidence such as comes only once in a generation.

As may be imagined from the preceding, the stock market was very quiet, and it was a poor week for specialties, like electrical shares. There was very little printed or reported of the General Electric Company. The stock was quite steady between 33 and 34. Some interest was created by a circular issued by the Walker company, in which it warns consumers to steer clear of the patent combination, and offers to dispose of a trolley guaranteed to avoid the Vanderpool patent. It promises additional literature on this subject in the near future, in which it will offer to replace all old trolley systems with its new apparatus at a material saving.

Metropolitan Traction Company cut a melon this week in the form of a 20 per cent scrip dividend. When this inside history came to the surface, no reference was made to a possible deal with Manhattan Elevated. This was rather chilling to the advocates of the latter theory. Recent developments have demonstrated that Mr. W. C. Whitney is in control and that he does not care to make a deal with the Manhattan. In view of the fact that this latter concern has cut its net earnings in two during the past few years, and is still on the down grade, it may be that Mr. Whitney has adopted the policy of the late Jay Gould, and will hold off until the Manhattan company falls into his lap. At the present rate of deterioration, he will not have many years to wait.

Dow, Jones & Company publish the following: "We learn that the Postal Telegraph returns from test offices for the first week of November were the largest in the history of the company. The returns for the second week, so far as reported, are showing corresponding increases. The telegraph business is reported very good."

On the Boston Exchange, Bell Telephone gained about 1½ points in the week, closing at 207. Erie Telephone was steady at 63 to 63¾. There was no demand for New England Telephone. General Electric preferred was steady between 70@72.

In Philadelphia, Electric Storage Battery, common and preferred, were steady around 30 and 32, respectively. Pennsylvania Heat, Light and Power was unchanged at 13.

In the New York market there was moderate transactions throughout the week in General Electric. The close was at 32¾. Western Union closed at 86¾. BAIN.

New York, November 21.

Edison, the X Ray and Blindness.

Last week a daily newspaper in New York city published a story to the effect that Thomas A. Edison had found a means of making the blind see, through the intervention of the X ray. Mr. Edison was anything but pleased when he read the story, and authorized the following statement to be made:

"A week ago I had been several hours in a dark room experimenting on the X ray. My eyes were very sensitive, as I had a powerful tube. I noticed that when my eyes were shut I saw the passage of my hand. I then blindfolded myself with my hand entirely. Then I could see the movement of my other hand.

"It naturally occurred to me that it might be possible for people afflicted with blindness of a peculiar kind, such as cataract, to see moving objects with the X ray. On Monday my attention was called to a telegram from San Francisco, in which it was stated that a colored boy had been enabled to see by means of the X ray. It was suggested that two blind men be brought to try the experiment. This was done, and experiments were tried on Tuesday night with different kinds of tubes. There were some favorable results.

"This was all that there was accomplished at that time, the men saying that they could distinguish little points of light."

Buffalo Electric Cars Run by Niagara Power.

As chronicled in the ELECTRICAL REVIEW for last week, the first test of Niagara Falls power, delivered in Buffalo, N. Y., was made early Monday morning, November 16. After several tests, made during the next day or so, to show that the apparatus installed at the last minute on the line was properly prepared to do its work, current was finally turned on the street railway circuit in Buffalo at 10.05 A. M. on Thursday, November 19. At that time the current from the Falls was connected with the bus bars feeding the Main street lines of the Buffalo Railway Company and the Kensington lines. At two o'clock P. M. one of the bi-polar Edison generators was connected to the same bus bars, thus running current from Niagara Falls in parallel with current from the street railway's own generators. Following this, the two rotary transformers, which change the alternating current from the Falls to direct current, were run in multiple and then connected with other generators of the railway company. Since the time named the cars have been running as satisfactorily as formerly with the current generated in the Niagara street power house.

Safety Company Gets a Cable Contract in Cincinnati.

The Safety Insulated Wire and Cable Company, of New York city, was last week awarded for the second time a contract to supply underground cables for the fire-alarm system of Cincinnati, Ohio. The contract was originally awarded to this company some weeks ago, but, owing to technical difficulties which came up, bids were again asked for, with the result as stated. General Manager Requa, of the Safety company, is to be congratulated on his enterprise and success in securing this important contract.

Wellsville, Ohio, Gets Electric Street Lights.

After a long struggle with the City Council of Wellsville, Ohio, the Wellsville Electric Light Company has just secured a contract for lighting the city for three years at $94 per lamp per year. The officers of this enterprising company are Homer Laughlin, president; J. Goetz, vice-president; R. L. Andrews, general manager, and W. E. Wells, secretary and treasurer.

High-Potential Insulators.

Mr. Fred M. Locke, of Victor, N. Y., manufacturer of high-potential insulators and indestructible steel insulator pins, has just received the contract for 5,000 insulators for the Blue Lakes Water Company's transmission line in California.

Electric Motors on the Long Island Railroad.

President Baldwin, of the Long Island Railroad, is quoted as saying that electric motors will be adopted on the short branches of his line, and will probably be in operation next Summer.

NEWS OF THE TRADE.

The Ziegler Electric Company, of Boston, makers of fine electrical and scientific instruments, have just prepared a very comprehensive illustrated catalogue of their product.

A new form of tubing for insulation purposes is being introduced to the electrical construction field by the Consolidated Insulated Tube Company, John Hancock Building, Boston.

The Bernstein Electric Company, Congress street, Boston, speak of a very heavy demand for the well known types of Bernstein incandescent lamps, and that the large factory, recently equipped by them, is operating practically at its full capacity of output.

Mr. George C. Ewing, 620 Atlantic avenue, Boston, offers in the advertising columns of this issue a number of special bargains in second-hand street railroad and electric light machinery of standard construction. Mr. Ewing's office is a general exchange for buyers and sellers of electrical apparatus.

The Globe Electric Light Company have recently equipped a large and well arranged factory in Malden, Mass., and are now in a position to furnish various kinds of "Globe" incandescent lamps. Mr. H. Berrenberg, general manager of the company, mentioned to a correspondent that the company were now producing 1,000 lamps a day, and would soon increase to 3,000.

The induction coils made by E. S. Ritchie & Sons, Brookline, Mass., are pronounced by experimenters as of unusual strength and advantage in X-ray work. A peculiarity of the "Ritchie" coils is that a spark of from one to two inches above the rating is always developed. It is generally known that the method of winding the secondary helix of an induction coil was perfected by the founder of this company, Mr. E. S. Ritchie, in 1853.

Mr. E. F. Dwyer, general manager of the Lynn Incandescent Lamp Company, Lynn, Mass., informed a representative of the ELECTRICAL REVIEW that the company's new plant would very soon be in operation, and that the establishment would be capable of renewing 10,000 incandescent lamps daily. This company operates exclusively in the reconstruction of worn-out lamps, perfecting them, it is said, equal to new, at a cost very much under the original.

The Boudreaux Dynamo Brush Company, 253 Broadway, New York, is preparing to materially widen its line of business, and is importing an attractive line of decorated electric switches of unique German design. This company has also accepted the selling agency for the holophanes made by the Macbeth Company, of Pittsburgh. In addition, they are importing a new Crookes tube for X-ray use, made in Germany from the accepted design with which, it is said, Roentgen and other European scientists have accomplished excellent results.

PATENTS AS INVESTMENTS.

READ BEFORE THE CHICAGO ELECTRICAL ASSOCIATION, OCTOBER 16,
BY ALBERT SCHEIBLE.

(*Continued from page 257.*)

The first rough pencil sketch may be quickly made the basis of a patent, but rarely of as broad and valuable a patent as it would if based on farther thought and trial. Indeed, the hasty patent often prevents the getting of a broader and not readily evaded one later on, so it is usually both wiser and cheaper to do some developing before drawing up the application. The law allowing the public use of an invention for two years before an application is filed seems to have been carefully timed, for my own experience has shown it to take about two years for an invention to mature from the pencil sketch to the working model, from this to the marketable form, and thence to the practically successful and patent-worthy form. Sometimes a very few months or weeks will prove an idea to be of little commercial value; then so much the better, for the patent money saved is just so much money earned and ready for a worthier device. If you want a practical illustration, look at some of the strongest and most feared patents; some, for instance, of Brush or Elihu Thomson. See what an insight they show into both the prior art and the field for the invention; also how well they cover those modifications which only suggest themselves to one who has been hunting for possible weak points in his own proposed patent.

Most inventors know that the extent of novelty and of usefulness in an invention will effect both the breath of the patent and its commercial value, but very few stop to consider that often more important point—their ability to profit commercially by the patent protection. There certainly ought to be definite prospects of a business worth protecting, else of what avail is the spending of money for a patent (which is merely the basis of legal protection against imitators)? In this respect we must, perhaps, except what might be called "speculative" patents as distinguished from those which come right in the line of one's regular work, and which are more truly "protective" of the results of this work. All patents may be said to combine more or less of both protection and speculation, but some are entirely out of one's line, not exploitable by the patentee, and hence merely taken out on a speculative basis. And, like all speculations, their promise of returns is vague and uncertain, the more so as they usually are not based on that thorough knowledge of the allied field which alone can lead up to the more strictly "protective" patents.

It is the speculative type of patents that leads to a large share of the unremunerative ones, and, unfortunately, the average inventor is surrounded by influences that tend to encourage rather than suppress the speculative tendency. Our newspapers tell about the fortunes made out of patents, and, as most men imagine that the big profits can only be made in some one else's business, they jump at the idea of "inventing" along a line where every turn brings up some thing new to them (though, perhaps, old and time-worn to those proficient in that particular line). So the man of ideas speculates first as to the novelty of his contrivance, then as to the great demand which will spring up for it, and perhaps even as to the rate at which manufacturers will tumble over each other to get control of his invention. A conscientious attorney would be apt to disturb his alluring dream, so he seeks the other and more eager kind, the ones that offer prizes to the most prolific originator of patentable (even if not patent-worthy) ideas. These urge him to make haste and file his application before some one wakes him, and if he hesitates as to the prospects of returns, they clinch his dollars with that money-wasting phrase, "No patent, no pay." They do not tell him to first consult parties commercially interested in devices similar to his invention, to learn if the calls for it would be by the thousand or only by the dozen. Nor is he allowed to think what he can do with the device after he gets it patented, but every effort is directed to interesting him in quickly getting some sort of a patent. He gets it and soon begins to wonder what he has got. Later on we can hear the grumbling about our inefficient patent system, about frauds which must have happened in order to spoil the inventor's chances, and about patents being "worth the full price of wall-paper."

It is easy to blame the Patent Office, but is it not the public that needs the educating? Look at the class of reading matter which the public accepts as wholesome. Send for one of those "inventor's manuals," published for free distribution by ever so many wholesale patent enticers, and what advice do you find in it? Let me quote from a few of these pamphlets: "Don't think you can't invent, but keep on thinking and you will invent something." "Nothing yields greater profits than patents." "Patents appear to be the poor man's only hope of escaping the slave's fetters." "Lose no time—the man who has ever conceived an invention and has failed to patent it until some one else has anticipated him, has lost the opportunity of a life-time to win a fortune with the least possible expenditure of time and labor." In other words, everybody that does any thinking should invent early and often, and should rush his applications into the Patent Office, through this or that attorney, before the idea is cold. Just as if any quantity of hurriedly concocted ideas, even if patentable, were more to be desired than a single carefully thought out and really patent-worthy invention. Such a patentee himself can only speculate as to what he has produced and what returns he may get for it, and is it for promoting such speculations that our patent system was established? If not, then why should we criticise the system for the results of this abuse?

But it is not always the patentee alone who does the speculating, for the man who advances the money for the patent, or who buys it after it is allowed, may be equally rash. He may really be looking for a success-worthy invention, but he does not know how to judge of it, and usually invests in whatever may be most enthusiastically presented to him; and the man of the vague, unstudied and unperfected idea, who knows no limitations to the prospects for his invention, can paint these prospects in far more glowing colors than the plodder, whose slowly evolved contrivance is really worthy of the money. Now, does it make any difference whether the inventor himself is the enthusiast, or whether a professional patent promoter does the shouting for him. Both are equally dangerous to the money interests of the public. And when the patentee does get the backing he needs, what then? How about the popular notion that the manufacturer who exploits an invention pockets all of the returns? Does the patentee really get the share he deserves or does the trouble lie in his expecting too much? At second thought, this question almost answers itself. Given the man who assumes a rough pencil sketch to be a finished invention, who thinks that any working shape satisfactory to him will be adapted to the general needs, who believes that what is new to him must be even more so to the public, and that his device will surely sell itself at sight, why should he leave much of the profit to any one else? He does not foresee the expense of developing the invention into a form that will suit the varying needs at different places; nor has he any idea of the money tied up in drawings, models, patterns, cuts and advertising. Yet all of these items must be paid for before the manufacturer can count any part of his returns as net profit; so it is not the capitalist's greed, but the shortsightedness and impatience of the inventor, that often bars a business connection which would be profitable for both. Speculation, and not business, seems to be the keynote to the course of the average isolated inventor; and it is this speculative tendency that dims his business judgment and leads to investments which can not average anything like the expected returns. Good business judgment would lead the man of ideas to a concentration of his work along the line of a particular need; and just as a business man needs to know both the merits and the defects of his goods, so the originator of a device must study its weak as well as its strong points before he can know what returns to expect from it.

And where shall we start to remedy some of this misdirection of energy, time and money? Right among ourselves, for it is the electrical engineer of to-day who can, and who ought to, counteract the rashness which is commonly thought to be proper for any one who originates a new contrivance or who spends money on it. The unwritten ethics of our profession demand that we should promote the legitimate and suppress the speculative in patents as in every other phase of electrical work. Then we owe it to our splendid patent system that we should insist on its being used only in the way which will be most helpful to general progress. And to whom can the isolated inventor look for guidance if not to us who have (or hope some day to have) a broad survey of the whole field of electrical engineering? Whatever we can do to turn his efforts from the rushing after many and narrow patents to the working out of a single and much needed one, will react for the benefit of our profession. Should not we be prepared both to judge of new devices ourselves and to guide the over-enthusiastic inventor so that he may see his own contrivance in a broader light? If four or five plain hints will help him, perhaps these will do:

1. First learn the state of the art, so as to see how much real novelty there is in the invention. Only the man who is well informed on what is old can know that a certain idea is really new, and we all need to take full advantage of those factors which keep us abreast of the times—like our electrical papers and our technical society meetings.

2. Consult parties commercially interested in the particular line, so as to learn whether or not the invention is worth patenting. Study the tendencies of the times to see if they are towards a more widespread or a more limited use of the invention.

3. Test the probable scope of the patent for yourself by trying to devise other means for producing the same result. Can you readily invent a way of getting around your proposed patent?

4. Consider what you can do with the patent after you get it. Can you properly exploit it yourself, or have you reason to believe that others can and will do so for you?

5. Find out something about your proposed attorney. Has he a broad knowledge of the field? can he clearly and concisely word patents? will he advise in favor of his client's interest or only for the benefit of his own pocketbook?

Given such hints to turn the latent energy of our inventors to thoroughness in their work and to a business-like estimate of its value; given also an undercurrent of protest against the speculation that sometimes masks in patents, and given a frank admission that the trouble with our patent system lies chiefly in its abuse at the hands of misguided inventors and investors—then may we not look for a finer type of patent applications and a higher estimate of the value of patents?

A Deserved Compliment to a Hard-Working Official.

Mr. F. C. Mason, superintendent of the police telegraph in this city, has been the recipient of flattering notice in the West. He has deserved praise for competence and industry, and has thereby differentiated himself from many public servants, so called, whose principal activities have been in political conventions, primaries and barrooms. Mr. Mason has followed his work with enthusiasm, and that is a quality that politicians and accidents in office reserve for affairs outside of their calling. He has greatly enlarged and modernized the service from the time of his appointment a dozen years ago, when only 14 precincts were equipped, and with the old dial machines at that. We are without doubt coming to a recognition of special talents and a demand for them in public work. There was a time when the man who was elected or appointed to any position whatsoever would have felt no more hesitancy in accepting the place and drawing all the pay thereto pertaining than a boy would hesitate about accepting pie. But there is a growing demand that people in positions like Mr. Mason's shall be qualified to fill them. If ability is required for private service, it is twice as needful in meeting the larger requirements of the public.—*Brooklyn Eagle.*

Improved Locomotives.

The new 10-wheel Baldwin passenger engines, which were among the 75 new locomotives recently purchased by the Baltimore & Ohio Railroad, and which were designed by General Superintendent Motive Power Harvey Middleton, are proving to be the finest and fastest engines in use on any railroad in this country. Their speed seems to be practically unlimited, and even with a mile a minute schedule they are able to make up lost time.

King's Views of Boston.

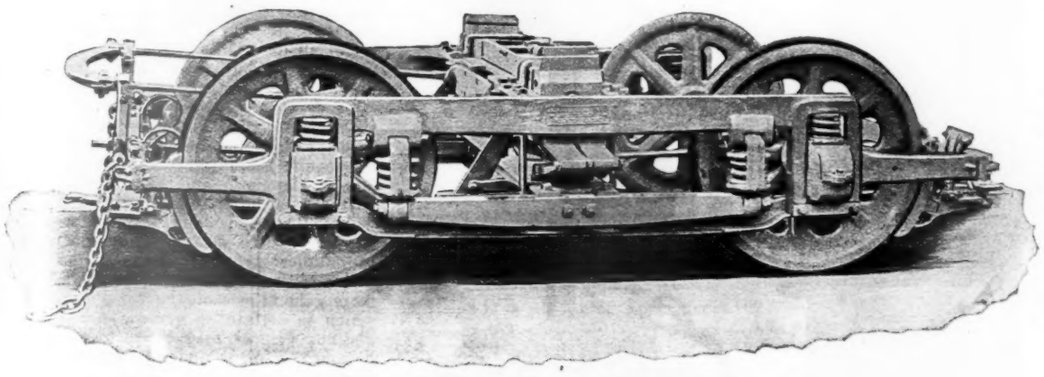
A very interesting pamphlet entitled, "King's Views Of Boston," containing 100 handsome photographs of interesting points in Boston, has been issued by the American Electric Heating Corporation.

The Brill No. 27 Perfect Truck.

The J. G. Brill company, of Philadelphia, are manufacturing a new type of truck for electric railway cars, which embodies a number of radical departures from trucks now on the market. It is known as the No. 27 Perfect Truck, and is shown in the accompanying illustration, for which we are indebted to our esteemed contemporary, the *Street Railway Journal*. Mr. J. A. Brill has devoted considerable of his personal time and attention to the development of this truck, and is naturally proud of the reputation which it has already established for itself.

Mr. G. Martin Brill, president of the J. G. Brill company, describes the No. 27 Perfect Truck as follows:

The truck is a new and radical departure from what has hitherto been the universal practice among car builders. It is the first improvement in the design of passenger trucks that has been made within the last 25 years. The new features are, first, the hanging of the equalizing bars upon the links so as to make them form a part of the moving motion, and, second, placing springs



THE J. G. BRILL COMPANY'S NO. 27 PERFECT TRUCK.

in these links. In the swing motion, or in rolling, these links lengthen as the weight comes upon them, and so prevent the bolster from pounding against the wheel piece. In ordinary trucks this pounding is a constant source of annoyance and danger. It is the cause of the quick and uncomfortable jerk always felt on entering or leaving curves.

The unusual ease of riding upon straight tracks comes from the fact that there are practically two sets of springs upon the spring plank, coiled springs under the elliptics, which give an entirely different motion to the body from that of the ordinary elliptic. At the same time, the journal-box springs still further soften the riding of the car.

The increased spread of the equalizing springs in a longitudinal direction, which brings them nearly to the journal boxes, has a great steadying influence upon the truck frame. The application of the brakes has little or no influence upon the springs, and there is no tilting or "kicking up" in making a stop. This is a feature which adds largely to the comfort of the passengers. It also diminishes minor accidents among those who are leaving their seats as a stop is being made.

Greatly increased safety is found in the use of these trucks. This comes in the first instance because the distance between the links or points of support of the body is increased from 18 to 20 inches. The angle of stability thus being greatly increased, the tendency of the body to roll upon the springs is practically removed.

The trucks stay persistently upon the track, because, while the wheels may have to change their direction of motion quickly, as at the entrance to curves, the body responds slowly, the elastic flexible connection between body and truck removing all shocks.

To show how well these trucks are performing, I may mention the fact that the Akron, Bedford & Cleveland road has been using them in competition with many other trucks. After an exhaustive trial, extending over a number of months, the company is now replacing all these trucks with the "perfect passenger truck."

LITERARY.

Richard Harding Davis was in London during the trial of Jameson's men, and took a great interest in the proceedings. He has written a dramatic sketch for the Christmas *Scribner's* entitled, "The Last Ride Together," giving the meditations of the Hon. Reggie Blake on the way to Holloway Prison.

An intimate friend of Kipling's, with whom he was for some time associated in editing a paper in India, recently remarked: "While possessing a marvelous faculty for assimilating local color without apparent effort, Kipling neglected no chance and spared no labor in acquiring experience that might serve a literary purpose." One who has been permitted to read in advance Kipling's new serial story, "Captains Courageous," which begins publication in the current number of *McClure's Magazine*, finds this habit of Kipling's especially manifest in that story.

LEGAL NOTES.

A jury in the Supreme Court, in Brooklyn, N. Y., last week gave Anna McCormack a verdict for $12,000 in her suit against the Nassau Electric Railroad Company for the death of her husband, John McCormack. A Fifth avenue trolley car in June last collided with an ice wagon on which McCormack was a helper, and he received mortal injuries.

In the matter of the application of the New York & New Jersey Telephone Company for a reduction of the assessment levied by the assessors, Justice Clement, in the Supreme Court, in Brooklyn, N. Y., last week handed down a decision by which the assessment is reduced from $1,019,327 to the sum of $424,164.32. Justice Clement finds that the company has $591,500 invested in patent rights, and this sum should be deducted from the sum of $1,019,327, the assessment levied.

ELECTRIC TRACTION UNDER STEAM RAILWAY CONDITIONS.

A TOPICAL DISCUSSION BEFORE THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, NEW YORK, OCTOBER 21, 1896—OPENING REMARKS BY DR. CHAS. E. EMERY.

(*Continued from page 256.*)

Again, it is essential that, on the road, speed be regulated by better means than a rheostat. A series motor varies its speed with the load, and so can not run without rheostatic regulation at a given speed if for any reason the number of cars in the train, or the track resistance, varies. It will, therefore, be necessary to return to commuted series field coils or equivalents, and it will be perhaps desirable to have a shunt winding, which can be used to give still closer regulation. In fact, shunt motors are being introduced abroad for traction purposes. The use of these devices will increase the weight of the motors compared with simple series-wound motors, for the simple reason that with the field reduced to the utmost, it must still be sufficient to prevent sparking, and there must be sufficient iron employed to make the stronger field efficient when it is desirable to run slower. These considerations make more room desirable for the motors than can be provided in the trucks of an ordinary car.

For these several reasons it is predicted that the high-speed electric locomotive of the future will, like the steam locomotive, be a structure independent of the train, that the motors will be hung on the frame independent of the driving wheels, and the same, as well as the driving wheels, connected by side rods. To obtain proper room under such conditions, larger driving wheels will be employed than the wheels of an ordinary car. This will so extend the wheel base that it will not be safe to run at high speeds without the leading truck the same as on an ordinary locomotive, and, in fact, the electric locomotive will in all its general features be a steam locomotive without the boiler, with motors substituted for the steam cylinders. In this way, and probably in no other, can the flexibility of the present steam locomotive be obtained. Probably there will be greater difference of opinion on this subject than on any other. The use of motors in the trucks of baggage cars is so fascinating that strong efforts will be, and should be, made to retain such a system, though the reasons stated are believed to be sufficient to prevent its general adoption. Again, it is desirable that the whole locomotive be a unit, on a strong frame calculated to resist the shocks due to collisions and accidents, and it is doubtful if locomotive drivers will be found who will be willing to risk their lives on any other kind of a structure.

To realize the flexibility of the ordinary locomotive, one has but to go on the line of one of the roads which has not yet adopted the heaviest type of rail, but yet runs express trains at 45 miles per hour, grasp a convenient post close to the line and a little around a curve, if possible, where one can take the wind of the train, and watch its approach. In many cases the locomotive sways nearly a foot from the perpendicular, first one way and then the other. At a bad joint the plunge is so rapid that the effect can be described as terrific, as one can not but think of the consequences if such a mass should leave the rails. The locomotive, however, follows the inequalities as readily as would a farm wagon. Electrical engineers may insist upon a more rigid and better track, but this will require additional expense and will not entirely overcome the difficulty. The electric locomotive must be constructed so that it will do the work of the present locomotive in the same way, and the feature of flexibility can not be sacrificed.

A modern heavy locomotive costs about $10,000, which is at the rate of $10 to $12 per horse-power, on about the same basis as electric motors would be rated. It needs little argument to show that an electric locomotive to take its place under conditions stated would cost fully as much. Moreover, if like care is to be taken of electric locomotives as of those for steam, the same number must be employed of like capacity for like work.

(*To be continued.*)

Reorganization of Incandescent Lamp Companies.

The Orient Electrical Company has recently purchased the plants of the Orient Electric Company and the New York Electric Company, formerly in business in Youngstown, Ohio, and has combined the two plants, and now has them in active operation, with a daily capacity of 4,000 lamps.

The new company is said to have ample capital to carry on the business, and as they have retained the skilled workmen of both old companies, they have every prospect of success.

Especial care is taken in submitting the lamps which they manufacture to a thorough and rigid test before they are allowed to leave the factory, and the new management believes thoroughly that quality is the most important item which will contribute to their success in the lamp market. The ELECTRICAL REVIEW wishes them full success.

KIND WORDS.

PROSPERITY ASSURED IN ADVANCE.

TO THE EDITOR OF ELECTRICAL REVIEW:

Inclosed find New York draft for $6, in payment for your valuable paper as per inclosed bill.

Wishing your enterprising paper all success, I am,

Very truly yours,

C. M. H.

Niagara Falls, N. Y., Nov. 14.

Mr. James I. Ayer, general manager of the American Electric Heating Corporation, of Boston, was a welcome visitor to the ELECTRICAL REVIEW office last week.

Report of the Board of Commissioners of Electrical Subways, of Brooklyn, N. Y.

BROOKLYN, October 31, 1896.

HON. FREDERICK W. WURSTER, Mayor of Brooklyn.

DEAR SIR: The Board of Commissioners of Electrical Subways respectfully offers the following report of work performed within its jurisdiction since December 15, 1895, the date of the last annual report. The presentation of this paper at this time is due to the fact that the work of the board must terminate with the present month. The statute creating the board contains the following clause: "The term of office of such commissioners shall expire on November 1, 1896, and from and after said time the powers and duties of said commissioners shall in each of such cities devolve upon and be vested in the Mayor of such city, and the Commissioner of City Works, or in place of the Commissioner of City Works, in such other local officer having the charge of the streets and highways of such city."

The following is a brief summary of the extent of the various electrical systems in the city of Brooklyn, the estimate being made to apply to the condition existing October 1. The amounts would require some modification to fit the date of November 1, as the work of extension is being vigorously prosecuted.

Aggregate length of electric conductors of all kinds within city limits is 22,052 miles.

Increase during this year, 1,681 miles.

Total length of wires under ground or suspended from elevated railways is 14,248 miles.

Increase since January 1, 1,939 miles.

Total length of underground conduit is 136 miles.

Length of single duct, 377 miles.

Sixty-five per cent of the electrical conductors within city limits are under the streets or suspended from the trusses of the elevated roads, or, excluding the city's wires from the estimate, 69 per cent of all wires under the jurisdiction of this board are thus disposed of.

The growth of the several systems during the present year is given in detail immediately following the subjoined table, which exhibits the mileage of wire belonging to the several companies at the beginning of the present year:

	Mileage. Aerial.	Mileage. Underground.
New York & New Jersey Telephone Co.	4,512.45	(a) 11,665.51
Municipal Electric Light Co.	224.50	(b) 82.60
Edison Electric Illuminating Co.		280.00
Citizen Electric Illuminating Co.	380.00	15.00
Flatbush Gas Co.	82.20	
Gold & Stock Telegraph Co.	12.30	
American District Telegraph Co.	150.00	
Stock Quotation Telegraph Co.	26 50	23.17
Postal Telegraph Co.	37.50	
Fire Department.	791.62	
Police Department.	445.00	7.00
Brooklyn District Telegraph Co.	147.00	
Holmes's Electric Protective Co.	11.00	
Eastern District Messenger Co.	12.00	
Union District Messenger Co.	0.00	
New York & Eastern Telegraph and Telephone Co.	(c)	
Western Union Telegraph Co.	338.00	69.11
National Automatic Fire-Alarm Co.	24.00	
Brooklyn Heights Railroad Company Lessees (trolley)	408.31	180.00
Kings County Electric Railway Co. (trolley)		
Coney Island, Fort Hamilton & Brooklyn Railway Co. (trolley)	221.55	
Nassau Electric Railroad Co. (trolley)		
Brooklyn City & Newtown R. R. Co. (trolley)	39.60	15.97
Atlantic Ave. Railroad Co. (trolley)	113.67	
Coney Island & Brooklyn Railroad Co.	39.25	13.50
Brooklyn, Queens County & Suburban Railroad Co. (trolley)	45.20	7.90

(a) Including 4,401.32 miles suspended from the elevated railways.
(b) Including 77.75 miles suspended from the elevated railways.
(c) No mileage reported.

The underground work during the year has been conducted with reference to relieving those streets of pole lines which were about to be newly paved or were completely lined with dwellings.

In sections remote from the completed subways pole lines have been extended as heretofore, the extensions being regulated by the requirements of public interest, though sometimes subjected to restrictions, owing to local opposition.

THE ELECTRIC LIGHTING SYSTEMS.

The Edison company under its old franchise has extended its system of wires by a length of $12\frac{6}{10}$ miles, inclosed in four and two-tenth miles of tubing. Lately many cases of electrolytic corrosion have been discovered, amounting to utter destruction of considerable lengths of their underground tube.

Under the franchise of the Citizens' Electric Illuminating Company, the above corporation has extended its aerial system into new districts. The subways for this system, which were constructed last year, have been in use this year, but with indifferent success. Cables constructed for the purpose of carrying the high-tension current demanded by the system failed repeatedly, and rendered necessary a return to the aerial line in order to fulfill the contracts for lighting. This series of accidents has prevented the removal of the heavy pole line in Rockwell place. The defects in the subway line have been cured, and the clearing of the above locality of its old overhead system is begun.

Some proposed extensions of the pole line in Fifth avenue, for the purpose of lighting the avenue, were met by opposition of the citizens. The company abandoned the plan and the gas lights were retained.

The length of overhead wires belonging to this company has been increased by 122.25 miles, mostly in the suburbs. The amount removed from the thickly settled portions of the city is 53.93 miles.

The clearing of the region above referred to in the vicinity of the power station, which will be effected before the close of the year, will result in the further reduction of overhead lines to the extent of 37.19 miles of wire and about 100 poles.

The Municipal Electric Light Company has increased its aerial system by 34½ miles, and its underground by four and six-tenths miles. This company now has 259 miles of wire on poles, 87 2-10 miles in conduits or suspended from the elevated railroad.

THE NEW YORK & NEW JERSEY TELEPHONE COMPANY.

The extension of the telephone system has been greater than that of any previous year. Not much change even in the details of construction has been required within the last two or three years. The wires buried in the early days of subway work have mostly required removal; the change to a metallic circuit from the original grounded one, the destruction of the lead covering of the cables through two or three causes, chiefly electrolysis, have rendered an extensive amount of reconstruction necessary.

The Long-Distance Telephone is connected with the system of the New York and New Jersey Telephone. The former system suffers by being associated with other wires in underground cables, even for short distances.

Telephoning to distant cities from Brooklyn is beset with much difficulty, whereas from New York the service is satisfactory to points within the distance of 1,000 miles. The difference is attributed to the fact that the special wire of the Long-Distance is buried between Brooklyn and New York. From the New York office it is extended on poles.

The Telephone company has increased its mileage of conductors in subways by 1,922.9 miles, and diminished its aerial line by 525.12 miles since January last.

THE DISTRICT TELEGRAPHS.

No change of policy has been adopted towards these systems. The remarks of the previous report may be repeated here:

"The district telegraph companies employ only aerial lines, which are mostly supported on housetops. To insist on the burial of these wires would abolish the system. The expense of underground conductors would render its operation, at present rates, or at any prices commensurate with services afforded, impracticable. Clearly, then, the public interests do not require the burial of these wires. The burglar alarms and the messenger boys can not be dispensed with, and while citizens demand this simple and serviceable means of electrical communication, the wires must remain in the air. Possibly, with a more general use of the telephone, which is certain to come, the two distinct services may be performed by one system of underground conductors."

The Automatic Fire-Alarm Company has added 15 miles of wire to its system during the year.

THE POLICE AND FIRE DEPARTMENT SYSTEMS.

The extension of the city wires has kept pace with the additions to the city's area. The fire department system has been increased 80.47 miles since January.

These wires supported on poles are to remain in this condition until an appropriation is made for the specific purpose of constructing an underground system.

The estimated expense of such a change is about $500,000.

(To be concluded.)

FIG. 1.—"CONNECTICUT" TELEPHONE ELECTRIC COMPANY'S EXCHANGE INSTRUMENT.

FIG. 2.—"CONNECTICUT" STANDARD TELEPHONE, WITH LONG-DISTANCE TRANSMITTER.

FIG. 3.—"CONNECTICUT" DESK TELEPHONE.

A Modern Police Station Opened in Brooklyn, N. Y.

On Thursday of last week a new and up-to-date police station was opened at Gates and Throop avenues, Brooklyn, N. Y. It is thoroughly equipped with electric light, fire-alarm signals, telegraph and telephone connections. Superintendent F. C. Mason, of the Brooklyn Police Department Telegraph Bureau, chaperoned a number of electrical men at the opening.

Death of G. W. G. Ferris.

George W. G. Ferris, designer and builder of the Ferris wheel at the World's Fair, died at the Mercy Hospital, in Pittsburgh, on November 23, of typhoid fever.

MODERN TYPES OF TELEPHONES.

ADVANCES IN TELEPHONE CONSTRUCTION—THE CONNECTICUT RECEIVER AND TRANSMITTER.

Recently the Connecticut Telephone and Electric Company, of Meriden, Ct., have had new photographs made of many of the types of telephone apparatus constructed in their factory, and have kindly given the ELECTRICAL REVIEW the benefit of them, for the purpose of illustrating the various forms of apparatus which are commanding attention through the "independent" companies.

FIG. 4.—"CONNECTICUT" INTERCOMMUNICATING BATTERY CALL SET.

The illustrations, Figs. 1 and 2, show the standard classes of instruments manufactured by them for exchange service. The instrument illustrated in Fig. 1 is considered an ideal one for exchange work. It is fitted with 10,000-ohm magneto, standard receiver, the "Connecticut" long-distance transmitter and two-cell backboard and battery box.

This set is also fitted with 1,000-ohm ringers, wired complete for multiple work. The dimensions are 32 inches high by 13 inches wide.

The instrument illustrated in Fig. 2 is for service where a particularly handsome and attractive telephone is desired. This is fitted with 10,000-ohm magneto, long-distance transmitter in nickel case, cord and pony standard receiver, as shown in the accompanying illustration. The dimensions are 26 inches high by seven and one-half inches wide.

These instruments shown only illustrate a part of the exchange apparatus made by the Connecticut Telephone and Electric Company, as perhaps five other forms are made standard by them, for varying usages and requirements. All of the instruments are fitted with the "Connecticut" self-contained gravity switch and magneto cut-out, operated by push button, or with automatic crank magneto cut-out and regular long lever gravity switch extending across the case.

The desk set, shown in Fig. 3, has been perfected to fill the demands for a reliable, efficient and handsomely designed ornament for application to the various systems of wiring used.

This set is fitted with gravity switch, double compound magnet receiver, and the same style transmitter as used on the long-distance arm. The metal work is highly polished and nickeled. The induction coil, switching device, buzzer and signal key are in the base.

The intercommunicating battery call set, Fig. 4, is a compact, serviceable instrument for building and factory use, and has a switch lever which insures contact—a difficulty which is usually present in this kind of instrument. The improved form of "Connecticut" receiver is worthy of notice. It is somewhat smaller than the Bell receiver, and is fitted with four bar magnets of the most perfect magnet steel. The lock-nut binding post is used, and it is absolutely adjustable, by means of small screws at either end. Fig. 5 gives a general idea of the receiver, Fig. 6 shows the long-distance transmitter used by this company and Fig. 7 the transmitter attached to extension arm.

FIG. 5.—"CONNECTICUT" TELEPHONE RECEIVER.

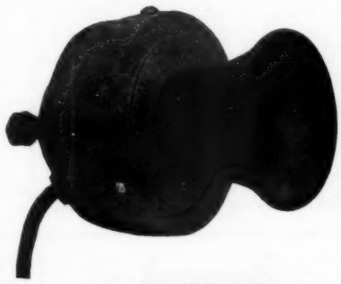


FIG. 6.—"CONNECTICUT" LONG-DISTANCE TRANSMITTER.

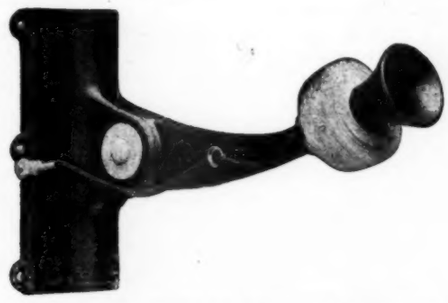


FIG. 7.—"CONNECTICUT" LONG-DISTANCE TRANSMITTER WITH EXTENSION ARM.

X Rays Save a Child's Life.

A press dispatch from Lambertsville, N. J., states that by the application of the X rays to the throat of a child which had been slowly starving to death, the child's life has undoubtedly been saved.

About two weeks ago Frances, two years old, the daughter of Watson Betts, of New Hope, while playing with a cent, put the coin in its mouth and swallowed it. Since then the child has persistently refused nourishment, and has been growing steadily weaker.

Dr. J. E. Scott was called in, but could not locate the coin. The parents, fearing their child would die, took it to the University of Pennsylvania Hospital on November 19 to be operated upon.

Dr. G. M. Marshall applied the X rays to the child's throat, and found the coin imbedded edgewise behind the cricoid cartilage. The child was brought home the next day, and a photograph of the X-ray result was forwarded to Dr. Scott.

Employing a coin-catcher, Dr. Scott, upon the second attempt, succeeded in removing the cent from its resting place.

The little one rallied quickly from the operation, and is now doing well. Dr. Scott says that had the penny remained in the child's throat much longer, the little one would have died, for it could not take any nourishment, and with great difficulty took water.

The Electric Railroad Company of the United States To Dissolve.

At a meeting of the directors of the Electric Railroad Company of the United States, held at the office of the company, No. 1 Broadway, New York, on November 19, it was voted that the courts should be appealed to to appoint a receiver to wind up the affairs of the company. It is understood that the company has liabilities to the extent of several thousand dollars, but it is thought that the assets, consisting of some of the basic patents in electrical propulsion, will prove to be of sufficient valuation to more than liquidate the obligations. This company was formed to exploit the electric railway inventions of Mr. Stephen D. Field. A combination with the owners of the Edison patent, together with the embarrassments incidental to patent-office litigation, resulted in a delay in its operations, which allowed the field to be occupied by later inventors, to the exclusion of the primary projectors.

White's Adjustable Incandescent Lamp-Holders.

Some three years ago the O. C. White Company, of Worcester, Mass., began to manufacture their adjustable holders for incandescent lamps. They have continued to add new designs and improvements, until now they are furnishing a complete line of their holders in styles, sizes and finish adapted to every requirement, from library to shop. They enable the incandescent lamp to be brought at once into just the position desired, and there securely held without the least attention having been given to the fastenings or joints.

The advantages gained from such ready adjustability are obvious. Shadows are entirely done away with, since the rays of light may be brought to bear from any direction. When brought into the desired position, the lamp can be turned at any angle, so that its shade may screen its glare. When not in use, the lamp can at once be pushed up out of the way, thereby avoiding danger of breakage. Again, perfect protection for the conducting cord is afforded.

THE O. C. WHITE COMPANY'S STYLE F ORNAMENTAL WALL BRACKET FOR INCANDESCENT LAMPS.

The O. C. White Company's holders are made for attachment in any conceivable place—ceiling, wall, floor, corner, post, desk, bench or table. Their quality and finish vary from that required in the finest library to that designed for the rough treatment of a machine shop.

The holders of the O. C. White Company are recommended to the public as an economy, in that they enable the lamp to shed its light to the best possible advantage; as a convenience, in that the range of movement is so great that the lamp may almost be considered portable, and as a perfect mechanical construction, in that they are simple, strong and durable.

Many of the leading manufacturing establishments of the country are equipped with these holders, and the O. C. White Company is ever ready to furnish any information in regard to their use.

ADVANCE INFORMATION

Valuable News and Tips for Manufacturers and Dealers.

We publish below information relating to new electric railways, new electric light companies, new telephone companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW.

Electric Light and Power.

BRIGHTWOOD, ILL.—A $4,000 electric light plant is to be erected.

BLACK RIVER, N. Y.—The Jefferson Power Company has been incorporated by W. P. Herring, J. H. Hiland and F. W. Herring, to develop hydraulic and electric power and to lease the same, etc. Capital stock, $135,000.

CHICAGO, ILL.—Lake Lighting Company has been incorporated by Walter Olds, Charles G. Griffin and Lee M. Old, to build a light, heat and power plant. Capital stock, $75,000.

OCONTO, WIS.—City Clerk can give information concerning establishment of an electric light plant.

ENOSBURG FALLS, VT.—City Clerk can give information concerning construction of an electric light plant.

NEW ROCHELLE, N. Y.—The Larchmont Electric Company has applied for franchise for an electric light plant.

MINNEAPOLIS, MINN.—The Gugler Electric Company has been awarded the contract for putting in an electric light plant at the Washburn Orphan Home.

NEW YORK, N. Y.—Arabella D. Huntington will erect a plant for electric lighting apparatus, northeast corner of Fifth avenue and 72d street, at a cost of $1,000.

PRINCETON, KY.—R. B. Boyce, of Covington, and Joe Eddins, of Tipton, will establish an electric light plant in this city.

PRESCOTT, ARIZ.—An electric light plant will be established for furnishing power to the mines.

DES MOINES, IOWA.—Mayor MacVicar can give information concerning the establishment of an electric light plant.

SHERBROOKE, QUEBEC, CAN.—The electric light company will increase their plant.

GRAND HAVEN, MICH.—A new electric light plant will be established.

BAY CITY, MICH.—A $15,000 electric light plant will be established for lighting the city public buildings.

SPRINGFIELD, VT.—It is said an electric light plant is soon to be established in Spencer Hollow, to be used for illuminating the buildings and running light machinery.

New Electric Railways.

FAYETTEVILLE, ARK.—The Fayetteville Electric Railway Company has been incorporated with J. A. Griffin, president; O. M. Wallace, vice-president; J. W. Lipsey, secretary and treasurer. Capital stock, $50,000.

LIMA, OHIO—The Lima Electric Street Railway Company has been incorporated by E. W. Moore, N. A. Gilbert, W. L. Corry, Adam T. Hill and Edward H. Tracey. Capital stock, $200,000.

NEW CASTLE, PA.—The New Castle Electric Street Railway Company will extend its system to Crayton.

NEEDHAM, MASS.—Plans are being made by the Newton & Boston Street Railway Company to extend its lines from the present terminus at Newton Upper Falls to a point on Great Plain avenue.

NEW HAVEN, CT.—The New Haven Street Railway Company has prepared a petition to the State legislature for an extension of its lines to Cosy Beach, a Summer shore resort of East Haven.

MARINE CITY, MICH.—A franchise has been granted to John B. Dyar and F. S. Parker for an electric railroad through this city, on condition that they file a bond of $2,000 to have the road completed by September 1, 1897. The road will run direct from this city to Mt. Clemens, leaving Algonac to one side, and entering Detroit on Jefferson avenue. If the traffic warrants, a spur will be run to Algonac.

AGAWAM, MASS.—J. F. Callahan can give information concerning proposed electric railway between Agawam, Feeding Hills, West Suffield and Rainbow.

Business Troubles.

WELLINGTON, OHIO—The electric light plant at this place is to be sold at sheriff's sale.

NILES, MICH.—The Niles electric light plant has been seized for debt. The plant is owned by the city, and the plant cost $240,000, all of which is now due.

WHITE PLAINS, N. Y.—The plant and franchises of the Consolidated Gas and Electric Light Company, of Westchester County, have been sold at auction for $190,000 under foreclosure. The purchaser was Charles Perry, of Westerly, R. I.

NEW YORK, N. Y.—Deputy Sheriff Butler has received an attachment against the Cathoscope Electrical Company, of 50 Broadway, for $3,325 in favor of Edwin Hammerschlag, on an assigned claim for balance due on patents sold to the company by Arthur A. Hammerschlag. The cathoscope is an apparatus for exhibiting Roentgen rays.

New Telephone and Telegraph Companies.

ANTIGO, WIS.—The Strauss & Marshall Construction Company, of Ripon, is now building a local telephone exchange in this city. About 30 subscribers have already been secured. Poles have all been set and wiring will be commenced to-morrow. It will be in operation in 10 days.

DU BOIS, PA.—The new telephone line from this place to Subula, Winterburn, Penfield and Benezette will be completed within about a week. The line enters Du Bois via Maple and Scribner avenues and Rose alley, connecting with the central office in the bank building.

ERIE, PA.—The Mutual Telephone Company will apply for a charter from the State and ask councils for a street franchise.

PIQUA, OHIO—The Callender Telephone Company has been granted franchise to transact business in Ohio.

New Manufacturing Companies.

NEW HAVEN, CT.—The Eastern Electric Company has been incorporated. Capital stock is $2,500.

ST. LOUIS, MO.—The Trans-Mississippi Electric Company has been incorporated. Capital stock, $2,000. Incorporators, E. P. Cowen, Ed J. Stiles and W. S. McMullan. The new company will handle electric conduits.

CHICAGO, ILL.—Lonsberry Manufacturing Company has been incorporated, to manufacture electrical machinery. Capital stock, $25,000. Incorporators, Herbert H. Hewes, George C. Purdy, David B. Carse, William B. Greenlee and Clarence Cummings.

Increase of Capital.

NEW HAVEN, CT.—Southern New England Telephone Company's stockholders will, in a few days, vote on a proposition to increase the company's stock from $2,000,000 to $3,000,000.

AUGUSTA, ME.—The Kinectic Power Company has increased its capital stock from $2,000,000 to $5,000,000.

THE LUXURY OF TRAVEL.

"The man who has never been West over the picturesque New York Central has a sensation in store for him that he can not afford to forego. Nature has done almost as much for him in what he sees as mechanical skill has done in placing him in a magnificent hotel on wheels, and whirling him toward his destination on the very wings of the wind."—*Hardware.*

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Superior to Calcium Tungstate; perfect definition; instantaneous work; each new image undimmed by phosphorescence or previous exposure.
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ONE QUARTER FIRST COST,
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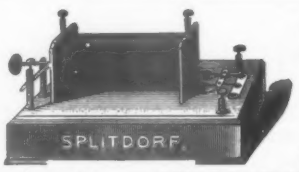

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THE EDISON MANUFACTURING COMPANY
New and Powerful
EDISON X-RAY FOCUS TUBES
Write for Catalogue
Edison Manufacturing Company
110 EAST 23d STREET NEW YORK

Kindred.... ...Interests

The American Engine Company, of Bound Brook, N. J., are about to ship one of their new American-Ball engines to the Chinese Government, to be used in driving machinery for the coinage of silver.

The Lincoln Electric Company, 239 and 241 St. Clair street, Cleveland, Ohio, has issued an illustrated catalogue and price list of its dynamos and motors. The company claims that its machines are efficient, low speed, good construction, sparkless and low price.

The Electric Appliance Company, Chicago, have recently furnished a special order of 5,000 feet of armorite iron-armored interior conduit specially painted while hot with a compound designed to protect the iron pipe from rust and corrosion. While this protection is not generally necessary in using iron-armored conduit, it seemed desirable in this particular case, and experts have pronounced this carload of conduit to be the finest lot of iron-armored conduit that has ever been seen in Chicago.

A contract for 25 air compressors and 25 air receivers, of medium and small sizes, has been closed by the Clayton Air Compressor Works, Havemeyer Building, New York, with one company, delivery of the entire order to be made within six months from date. They also report sales of five air compressors of standard pattern during the first week in November, and the indications point to a decided revival of trade in air compressors, many orders having been held in abeyance, pending the result of the election.

M. R. Rodrigues, manufacturing electrician, 17 and 19 Whipple street, Brooklyn, N. Y., speaks of the outlook in his business as follows: "We are very busy with orders on hand, and the prospects are decidedly better than ever before in my line. Just now our 'Baby' motor is in the lead, while a little later we will start on a large order of 12-inch fans, which will keep us going full time until next season. We are making tools for 12, 14 and 16-inch fans and 13, 15 and 17-inch guards. Our work is not confined strictly to electrical devices or accessories, for during the past week we have turned out the full set of tools for making button fasteners, which may (or will, the inventors think) revolutionize things in general."

A very complete line of electric heating apparatus has been perfected by the Globe Electric Heating Company, of Philadelphia. The method of construction of many of the heaters, particularly the street-car heaters, embodies certain advanced ideas relative to the use of electricity for heat, which probably will lead to a more general adaptation in this line. New developments of portable electric house heaters of various designs and smaller "stoves" for household use have been designed by this company, so that they can be produced in large numbers. Their street-car heater operates with a minimum current at 2.5 amperes and a maximum current at five amperes, with a temperature at the grated opening from 160 degrees to 220 degrees Fahrenheit.

THE THEORY OF SUCCESS.

The New York Central management evidently proceeds on the theory that the more care there is taken of a traveler the more he will travel—witness its "limited" trains, block signals, free attendants, and the comfort and luxury surrounding one from beginning to end of a journey on "America's Greatest Railroad."

WANTED.

A small second-hand single-phase alternator (without exciter), 5 to 25 horse-power, any voltage, but preferably 2,000 volts. Price must be low. Address, giving particulars and lowest cash price, to "W. A. S.,"
ELECTRICAL REVIEW,
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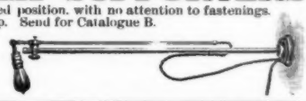

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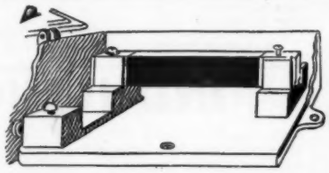
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Capacity, 1,500,000 feet per month. Cylinders, 100 feet long

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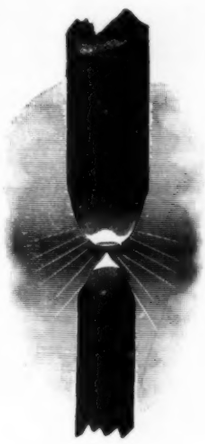
Electric Light Carbons—Soft-Cored and Solid Carbon Brushes. Battery Carbons and Carbon Specialties.
ADDRESS 95 FIFTH AVENUE, PITTSBURGH, PA.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BRILLIANT, STEADY and EFFICIENT LIGHT
FOR
ALTERNATING AND DIRECT CURRENT.

SCHIFF, JORDAN & CO.,
OF VIENNA,
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NEW YORK.

Electrical.... Patents.

[Specially reported for this journal by E. S. Duvall, solicitor of patents, Loan and Trust Building, Washington, D. C. Copies of any patent may be secured for 10 cents each.]

ISSUED NOVEMBER 17, 1896.

571,328 Electrically operated water system; J. P. Barrett, Chicago.

571,351 Electro-magnetic signal-receiving instrument; S. D. Field, Stockbridge, Mass.—A polarized relay having its electro-magnetic core wound with two independent magnetizing coils or windings of equal and opposite magnetizing power, but unequal inductance, the said coils being connected in parallel with one another.

571,363 Electric governor for water-wheels; W. W. Handy, Baltimore, Md.—An electric motor connected to the gate or valve by means of worm and other gearing, switches which break the current through the motor when the gate or valve is closed or fully open, and connections between the motor and a source of current, whereby the motor may be caused to run in opposite directions, and at speeds proportional to the changes in load.

571,399 Telephone transmitter; D. N. Rowan, Irvington, N. Y.—Consists of flexible, non-conducting shelves, electrodes and granular conducting material suspended on the shelves between the electrodes.

571,409 Electric brake; E. A. Sperry, Cleveland, Ohio—Consists of a brake circuit containing a dynamo electric machine, a storage battery with a device adapted to connect the battery in the brake-circuit in one direction for charging and in the other direction for discharging.

571,410 Electric controller; E. A. Sperry, Cleveland, Ohio—Consists of a contract cylinder, a limiting switch mounted on the core of a magnet, an arm for opening the switch and a cam actuated by a movement of the controller handle for operating the arm.

571,420 Commutator brush; A. K. Warren, New Brighton, N. Y.—Consists of material adapted to rub on a commutator, an extension piece of similar cross section to the brush and means for fastening the brush and extensions together.

571,426 Electric thermometer; M. A. Agelasto, Norfolk, Va.

571,435 Electric railway system; G. J. Forrey, Carlisle, Pa.

571,441 Electric signal box; W. W. Hibbard, Rochester, N. Y.

571,445 Annunciator; F. A. Jennings, Ithaca, N. Y.

571,460 Primary battery; S. N. Smith, Minneapolis, Minn.

571,462 Field magnet structure; D. P. Thomson, Schenectady, N. Y.—A field-magnet structure for a dynamo-electric machine, consisting of salient poles of laminated structure, provided with separate laminated tips and means for securing the tips to the poles.

571,463 Controlling electric arcs; E. Thomson, Swamscott, Mass.

571,467 Regulating polyphase circuits; A. H. Armstrong, Schenectady, N. Y.

571,472 Track instrument; T. B. Dixon, Henderson, Ky.

571,478 Alternating-current motor; M. Hutin, Paris, France—An alternating-current motor, in series with a circuit or circuits of the same, an electrolytic polarization battery, adapted to yield an electromotive force opposed to that of the self-induction of the said circuit or circuits.

571,489 Manufacture of electrical resistances; A. J. Marquand, Cardiff, England—An electrical resistance composed of asbestos cloth, having deposited in its texture carbon resulting from the decomposition of carbonaceous material in contact with the asbestos cloth.

571,502 Electric elevator; R. Wilson, Louisville, Ky.—Consists of a car, an electric motor, two speed-controlling rheostats and a solenoid having two independent cores respectively operating said rheostats.

571,504 Microphone transmitter; E. A. Barkalow, Kokoma, Ind.

571,559 Electrical switch conductor; W. H. Sawyer, Providence, R. I.—Consists of an elastic rubber core, with one or more wires or conductors, and an inclosing wound or braided covering.

571,600 Controller for electric pumps; F. W. Merritt, Duluth, Minn.

571,655 Electric furnace; A. C. Girard, Paris, France—Has a fixed carbon tube or casing, through which the material to be heated is fed, said carbon tube or casing constituting a common electrode, and one or more other electrodes arranged in proximity to said carbon tube, to produce an arc outside of said tube, whereby the material under treatment is separated from the arc.

571,695 Telegraph switch mechanism; F. P. Scott, Terre Haute, Ind.

571,706 Electric cable; Silvanus P. Thompson, London, England—A cable comprising two or more insulated conductors running there through side by side, and provided at intervals with compensating devices for diminishing the electro-static capacity.

571,723 Electric gas-lighting apparatus; C. W. De Mott, Brooklyn, N. Y.

571,730 Combined electric hydraulic elevator; J. Parkinson, Los Angeles, Cal.

571,731 Combined electric hydraulic screw-controlled elevator engine; J. Parkinson, Los Angeles, Cal.

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571,734 Electric cut-out; B. F. Rout, Stanford, Ky.

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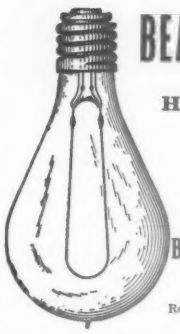

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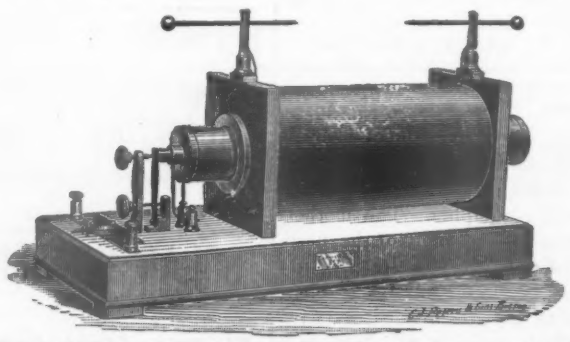

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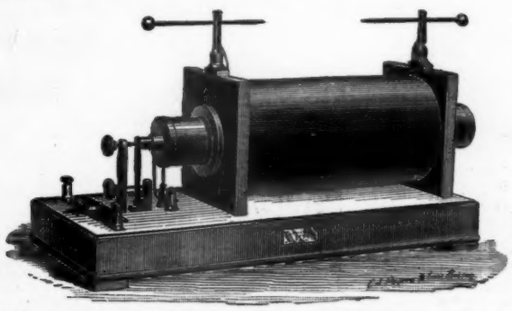

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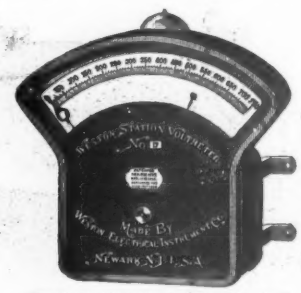

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